INDUSTRIAL MEDICINE AND SURGERY

INDUSTRIAL MEDICINE

The International Journal of Medicine in Industry

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INDUSTRIAL MEDICINE AND SURGERY

NOVEMBER, 1957

Employees' Food Services Facilities

A Medical Department Advisory and Supervisory Function

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SUPERVISION of sanitation of industrial food services together with hygienic supervision of food handlers clearly constitutes an item on any well devised occupational health program. Further, the nutritional values of the foods served warrant medical surveillance. This industrial medical function more often is ignored than applied, particularly if the food services represent a concession. It has been stated[1] that one-third of the known diseases of man are associated with food. This publication seeks to present the requirements of a high-type food service under the scrutiny of the plant Medical Department. What better place is there to practice preventive medicine than in the food service facilities?

Location

IDEALLY, in the choice of a site for the plant cafeteria, the following are considered: The location is such that no employee will have to enter the cafeteria or lunch room without having had access to adequate latrine and washroom facilities. The cafeteria is separated from noise, dust, fumes and odors of the general plant. The locker room or the work bench does not double as the lunch room. Freedom from excess noise and unpleasant odors is as necessary as light, ventilation, cleanliness, and comfort. Accessibility to all without rush or delay by prolonged waiting, which is irritating to the general nervous system as well as to the digestive system, is an added requirement. The employees look forward to the meal interim as a period of relaxation and enjoyment, where, in pleasant surroundings, they can enjoy good food and the companionship of their fellow employees. Such a period is a tranquil respite from the pressures of modern industrial production. They leave the area refreshed, rested, and content, ready to renew with increased vigor and stamina the more difficult and fatiguing second-half production efforts.

Equipment

THE CHOICE and extent of kitchen facilities will depend on the requirements of the cafeteria. If hot meals are to be prepared and served, and pastries are to be baked on the premises, the equipment should be as elaborate as that of any modern public restaurant. If a caterer supplies the prepared food and merely serves it from heated steam tables, the equipment can be held to a minimum. The fact that the caterer prepares the food at a different location does not excuse the Medical Director from periodic visits to this site, to insure complete sanitary protection for his employees. Those of us who worked as preventive medicine officers in the services were

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often astounded by the low level of sanitation practiced by our civilian caterers. In their efforts toward maximal "marginal squeezing" the most flagrantly unsanitary practices were evident. In our major modern cities, with enlightened health departments, we can expect greater protection than in the past in respect to sanitary inspections and health regulations for food caterers. However, unless the caterer has the facilities for and a knowledge of sanitary practices, sanitary inspections are worthless. It does not take a "practiced eye" for a plant physician to judge the sanitary level of his caterer once he has visited the site of food preparation, refrigeration, and storage.

Savage,[2] in a recent article, calls attention to the increased incidence of food poisonings, particularly with Salmonella. He feels that more food is passing into the hands of commercial food handlers, "whose practices often fall short of essential hygienic standards!"

The Medical Director may have little to say about the type and purchase of kitchen equipment, but he can give considerable advice on how the equipment, once purchased, can be safely used. The number and severity of lacerations of hands and fingers when our kitchen was opened was of considerable concern. The employees were unfamiliar with the equipment and often had to learn through bitter experience that the rotary blades on a salad slicer did not selectively cut lettuce and tomatoes, and reject finger tips. The kitchen supervisors spent many hours in training and demonstrating before solo operations were permitted, only to have the experienced operator become careless and injure herself in a heedless and thoughtless manner. Many soon learn that the wooden pushers and feeders, although not as fast and dexterous as the human fingers, are more easily replaced. The meat cutters and butchers, who supposedly are masters of their trade, suffer numerous lacerations and puncture wounds. They tend to be careless in such minor details as arrangement of knives in drawers. It is much easier to remove a single knife from a drawer when the knives are neatly arranged with blades pointing away from the user. The butchers must be checked constantly for festering wounds, because their streptococcal and staphylococcal contaminants could quite conceivably infect meat and initiate an epidemic of food poisoning. To keep these lacerations clean and relatively aseptic requires judicious use of antibiotic ointments and clean, sterile dressings which should be changed at frequent intervals.

The ovens, stoves and ranges are a constant source of burns. Training in the use of fire extinguishers is a prerequisite to being a cook. Water is not always the best fire extinguisher, particularly in grease fires. The grease traps must be changed at frequent intervals. Cleaning rags when soiled must not be stored near the hot ovens. Excess carbon deposits from baking overflow should not be allowed to accumulate in the ovens and around the pilot fumes. The danger of exploding gas leaks is ever present. If the Medical Director hopes to control kitchen burns, he must be aware of their source and suggest preventive measures.

A common, causal site for lacerations and dermatitis is the sink. The pot and utensil cleaners keep their hands immersed for hours in detergent solutions. Groping in murky water, they are as likely to grab a knife by the blade as by the handle. Rubber gloves and gauntlets, to be effective, must extend almost to the axilla. We have had difficulty in finding a manufacturer of such a single device. The skin protective creams are effective in many cases when the pot washer remembers to apply them at frequent intervals. Unless he develops a dermatitis from the detergents, he fails to be impressed by the need for protective ointments. Steel wool and metal pot cleaners disintegrate into fine, sharp foreign bodies that readily penetrate the epidermis. Many such particles secondarily infected will cause a rather refractory dermatitis.

Stainless steel preparation tables have proved most satisfactory. They are easy to clean and durable. Wooden blocks are difficult to clean and need frequent resurfacing.

Dishwashing

NO FOOD service facility in our modern era of mechanization, sterility and efficiency, can operate satisfactorily without automatic dishwashers. The study of Chapman and Vinsel demonstrated the adequacy of automatic dishwashing machines and detergents. "Finish" or "Calgonite" detergents used in dishwashers in the prerinse and wash cycles at warm temperatures, 150°F and above, promoted rapid removal of all the detectable viruses of influenza, mumps, herpes simplex, vaccinia, poliomyelitis, and T_1 bacteriophage. These viruses ordinarily survived on soiled dishes for at least 24 hours.[3]

Lacerations have resulted from the sharp edge of the manufacturer's identification plate on the dish rack and the unfinished edges of trash receptacles. Any moving part or projecting edge is a potential source of contusion or laceration.

Wet floors can easily be a cause of severe falls and back injuries. Careful selection of floor covering and adequate drainage will aid in preventing such injuries.

Refrigeration

OF VITAL concern to the Medical Department are the facilities for refrigeration. The type of food that may be served and the length of time that food may be saved depend primarily

Fig. 1.
Ovens: a source of burns, easy to clean and maintain, modern kitchen equipment.

Fig. 2.
Equipment: stainless steel preparation tables, modern ovens, ventilation.

on the refrigeration facilities. Separate areas should be provided for fish products, green vegetables, poultry products, and meats. The temperatures should vary, depending on whether the product will spoil slowly or rapidly. A deep freeze must be maintained for long-term storage of meats and fish products. A chill box is adequate for short-term storage of vegetables. Improper refrigeration is a leading factor in food poisoning from staphylococcal, streptococcal, and Salmonella organisms.[4] Potato salad, milk products, poultry products, and ham should never be served unless there are adequate measures for refrigeration. Cooking of food does not destroy the enterotoxin produced by the staphylococcus.

The arrangement of food in a refrigerator is noteworthy on the part of the medical inspector. All food should be on shelves, off the floor. Some cooks, in their misapplied frugality, keep cooked foods beyond the limit of esthetic, if not practical, periods of preservation. Severely dehydrated and moulded meats and vegetables should be discarded and not permitted to clutter the refrigerator or shelves. There is a reasonable "point of no return" for salvageable foods.

Food poisoning has been traced to crushed ice contaminated by careless handling. Machine-made ice is relatively safe if not directly handled. A chlorine bath is advocated for hand-crushed ice.

Garbage and Refuse Disposal

DISPOSAL of refuse and garbage is a medical problem in a negative sense. If they are not adequately contained, covered, and disposed of, they will attract insects and rodents, and emit offensive odors. All kitchen and eating areas should be screened. No latrine area should open directly into a food preparation area.

Insects and Rodents

THE Medical Director must acquaint himself with the local varieties of insect and rodent life. He may not know the specific measures for their control but he should be able to recognize their presence and the conditions that will attract them to the kitchen and dining areas. He should be on the lookout for insect powders in the food preparation areas which inadvertently might find their way into the food as flour or seasoning.

The *Hartford, Connecticut, Health Bulletin* presents an excellent illustrated chart on the recognition and control of household pests.[5]

Brown,[6] in 1955, prepared a paper on the control of domestic rodents, which is only one of many publications available at the Communicable Disease Center, Atlanta, Georgia.

Littig's[7] paper on "Insect and Rodent Habits" ought to be read by all plant physicians. He states that "proper storage of garbage in covered containers, elimination of rubbish and trash, and closing of rat entries into buildings, are essential to successful operations in rodent control."

Medical Inspections

A CLOSE working liaison between the plant Medical Director and the food services manager can be strengthened by occasional inspections. In my company these inspections were requested by the cafeteria manager. They are conducted on a periodic basis, in a friendly manner. Unlike the Armed Services and Health Departments, they have no regulatory or authoritative function.

An inspection check list is made so that a record of the visit and suggestions given may be reviewed. A check list is a convenient aid to the inspector in completing a thorough visit. The inspection visit is ideally suited to sanitary instructions, as discrepancies are explained when they are noticed and questionable situations and practices are "ironed out" on the spot.

Medical Supervisory Functions

ONE of the Medical Director's most intimate contacts with the cafeteria comes during his examination of the employees. In a large medical organization such as that maintained by our

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FOOD SERVICE FACILITIES INSPECTION

INSPECTOR	FOOD SERVICE PERSONNEL	DATE OF INSPECTION

Rating: E — Excellent; S = Satisfactory; U = Unsatisfactory

RESTAURANT	DRESSING ROOMS AND LATRINES	REFRIGERATORS
Tables and chairs	Repair	Temperature
Floors and walls	Cleanliness	Storage arrangement
Windows	Hot water and soap	Cleanliness
Condiments	Clothing storage	Condition of food
Silverware	Toilet bowls	
Water stations		
SERVING COUNTERS	**DISHWASHING**	**PERSONNEL HYGIENE**
No. 1	Water temperature (170°)	Cleanliness
No. 2	Garbage disposal	Hairnets
No. 3	Floors and walls	Finger nails
No. 4	Washers and conveyors	Clothing
KITCHEN	**BAKE SHOP**	**OTHER**
Food preparation table	Preparation tables	Insects and rodents
Mixers and cutters	Mixers and cutters	
Sinks	Flour storage	
Ovens and grills	Ovens	
Utensils	Utensils	

COMMENTS

SIGNATURE OF INSPECTOR | SIGNATURE OF FOOD SERVICE REPRESENTATIVE

company, it has proved satisfactory to relegate all functions pertaining to food service and its personnel, to a single doctor. He examines the employees prior to employment and yearly thereafter. He sees them when they are ill, injured, and returning from sick leave. It is his responsibility to instruct them and advise them in sanitary practices. He decides when, where, and if, they can work when they have respiratory, skin, or gastrointestinal disorders.

The pre-employment examination consists of a complete medical history and physical examination, x-ray and laboratory studies. Special emphasis is placed on history, and signs and symptoms of respiratory or gastrointestinal diseases. Our laboratory studies routinely consist of urinalysis, blood serology, hemoglobin and white cell determination, stool culture, and, when indicated, throat culture.

We recently initiated stool examinations on a pre-employment and periodic basis. The stools are cultured for Salmonella and Shigella organisms. During a six-month period approximately 80 stools were cultured. There was only one positive report — that of an organism of the Escherichia — paracolon group. This specimen was taken the day following an acute episode of gastroenteritis. Subsequent examinations were negative. In view of the fact that we hire displaced persons for cafeteria work and there continue to be reports[8] of typhoid and Salmonella, we are continuing stool cultures. In 1955, more than 5,000 cases of Salmonella and 150 cases of typhoid were reported in six Midwestern states.

We are now considering the study of stools for ova and parasites. During my duty with the Air Force in the Pacific (1950-1953), we examined the stools of mess personnel for ova and parasites, but we did no stool cultures. The number of positive cases was noteworthy. This examination was equally productive of positive specimens at a New York State air base. The most perplexing cases and the most refractory to treatment were the asymptomatic amebiasis cases. Giardia lamblia, Balantidium coli, Trichina spiralis, Trichuria, Ascaris lumbricoides, Enterobius vermicularis, Necator americanus, Anklyostoma duodenale, Strongyloides stercoralis, Taenia saginata, Taenia solium and Diphyllobothrium latum, were among the parasites that were noted almost routinely.

Ringe[9] reports that in 1956, 112 cases of Endamoeba histolytica were reported in Connecticut. Most of these were from immigrant families and Armed Forces personnel. Careful consideration should be given to the level of hygiene and source of one's cafeteria employees. It might prove quite rewarding to do ova and parasite studies as well as stool cultures.

Periodic health examinations are performed on an annual basis. A review of the employee's interim medical history and symptoms is a factor in deciding the extent of laboratory and x-ray examinations.

The annual physical examination gives the physician an excellent opportunity to counsel the employees on sanitation and personal hygiene. We make every effort to impress them with their importance to the health of those they serve.

Each woman employee whose age was between 35 and 60, was questioned as to whether she examined her breasts routinely for tumors. Only four of the 80 so questioned performed such an examination. The majority of these individuals admitted either seeing a motion picture on the subject, shown by the American Cancer Society, or reading about the desirability of such self-examination.

Their major reason for not examining themselves might be classed in the apathetic philosophy of the ostrich with his head in the sand. They were content to let someone else (the physician) worry about it.

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Fig. 3.
Meat preparation: accessible refrigeration, careful use of power cutting equipment.

Fig. 4.
A cheery, bright, clean and healthy atmosphere . . . pleasant surroundings . . . companionship.

Conclusion

THE preceding paragraphs have outlined a method of approach by the industrial physician or Medical Director to his in-plant cafeteria sanitation, where hazards of poor sanitation are as great as the occupational disease hazards of which he is keenly aware. He functions in an advisory capacity by periodic inspections of the cafeteria facilities. He is able to answer the medical and sanitation questions in an interested and intelligent manner. To do this, he becomes familiar with local, city and state regulations pertaining to eating places and to food service personnel. He meets and is on familiar terms with the local health director and sanitarians, and accompanies them on their periodic visits.

The first aid facilities must be nearby and adequate; otherwise many skin lacerations may not be brought to his attention until they are painfully infected.

The Medical Director's actual supervisory duties differ from the advisory functions, as they entail coming into direct contact with the food service working personnel. He arranges preemployment, periodic, and special examinations. He provides adequate treatment for multiple types of lacerations, burns, and contusions, and an occasional more serious injury.

One of the physician's most exacting supervisory duties is the education of his charges — supervisors and workers — in food sanitation and preventive medicine. Our first bulletin to all personnel presented the following message:

"Many of you are now aware of the specialized treatment that you are receiving through the Employee's Health Service. You are examined by the same doctor at the time of employment and annually thereafter. You are given different laboratory examinations and must report for examination after every illness regardless of its duration or cause.

"Your health is of vital importance to the Medical Department because of your work responsibilities and the direct influence that your good health may have on all Travelers employees. Your contact is with the food and food service implements which would transmit your infectious diseases to healthy individuals.

"The Medical Department must maintain vigilance in early recognition of your communicable diseases by signs and symptoms. You, in turn, have the direct moral responsibility for exercising strict personal hygiene and cleanliness, as well as immediately reporting your illness to our Department."

Summary

THE PRACTICE and application of preventive and occupational medicine in industry extends into many regions of plant operation, not the least of which is the food service facility. The Medical Director has the obligation to provide adequate advisory and supervisory services for this operation. The extent of his duties in this sphere will, of course, depend on the size of the plant and the type of food service that it offers its people. Eating and the diseases spread through this essential function are of vital concern to the Medical Department. A cafeteria, slovenly run with disregard for the modern practices of sanitation, is a hazard to the health and welfare of the industrial worker.

(700 Main Street.)

References

1. WEISENHOFF, E. D., and SHERMAN, L. K.: Sanitation in Public Eating Places. *Connecticut Health Bulletin*, March, 1957.
2. SAVAGE, WILLIAM: (*Brit. M. J.* 2:317, 1956) *JAMA*, October 6, 598, 1956.
3. CHAPMAN, S. STEPHEN, VINSEL, B.: The Removal of Viruses During Dishwashing. American Public Assoc., November 12, 1956, Atlantic City.
4. Editorial: Salmonella Food Poisoning. *JAMA*, 163:4 (January 26) 1957.
5. Hartford, *Connecticut Health Bulletin*, Vol. XXII, March, April, May, 1956.
6. BROWN, R. Z.: Biological Factors in Domestic Rodent Control. U. S. Dept. of Health, Education and Welfare, Public Health Service, Communicable Disease Center, Atlanta, Georgia, 1955.
7. LITTIG, KENT S.: Insect and Rodent Habits. *Pest Control*, October, 1955.
8. DAUER, C. C., and SYLVESTER, G.: 1955 Summary of Disease Outbreaks. *Public Health Report*, 71:797 (August 6) 1956.
9. RINDGE, M. E.: Amebiasis in Connecticut. *Connecticut Health Bulletin*, May, 1957.

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Acute Decompression Illness

A REPORT OF FORTY-FOUR CASES

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DECOMPRESSION illness, more commonly spoken of as the "bends," has been a known clinical entity from the earliest days of the professional sponge fishermen of the Mediterranean and the pearl fishermen of Ceylon. Other terms for this condition are "divers' paralysis," "caissons disease," and "compressed air illness," while those who work in compressed air are familiar with it under such symptomatic terms as the "chokes," "staggers," "itch," and "fits."

Death or permanent paralysis was an all too common and accepted hazard for those who exposed themselves to inadequate decompressions. It was known then and it is known today that the symptoms of this condition appear only after decompression and never during compression.

In 1890, Bert placed a rabbit under high pressure using ordinary air, and, on autopsy, after rapid decompression, found nitrogen bubbles throughout the entire body. Using pure oxygen, however, no bubbles at all were noted after similar rapid decompression. He was the first to postulate the theory of too rapid decompression releasing nitrogen bubbles as emboli in the blood stream instead of allowing gradual loss of nitrogen through the lungs.

Decompression illness, properly speaking, is less a true disease and more a physical phenomenon. It can be explained most simply by the illustration of the capped bottle of charged soda water in which all of the gas is in solution owing to the increased pressure inside the bottle. When this pressure is released suddenly, e.g., when the cap is removed, the gas emerges from the solution as bubbles and will continue to do so until the partial pressures of the gas in the liquid and in the surrounding atmosphere are equalized. Exactly the same phenomenon occurs, too, in the human blood stream. Compressed air is dissolved in the blood, but, when released too rapidly, nitrogen bubbles appear and act as emboli which emigrate to all points of the body.

The symptomatology follows directly the area of circulatory blockage by the nitrogen bubbles as well as the total amount of free gas liberated. For example, small amounts of gas in a bursa or beneath a tight fascia may cause severe pain in a joint — a relatively minor albeit painful condition. A similar blockage in a cerebral area can cause diverse sensory or motor disturbances, including paralyses or even death.

In general, the behavior of compressed air follows the standard principles set down in these few physical laws:

1. Charles' Law — At constant pressure, change of volume of a gas is proportional to the change of temperature.

2. Boyle's Law — At constant temperature, volume of a given mass of gas varies inversely as the pressure.

3. Henry's Law — With a constant temperature, the quantity of gas which goes into solution is proportional to the partial pressures of the gases concerned.

4. Dalton's Law of Partial Pressures — In a mixture of several gases or vapors that do not react on each other chemically, the pressure exerted is approximately the same as if each constituent exerted the full pressure it would exert if each alone filled the entire volume.

THE CASES described in this paper occurred during the compressed air phase of the driving of the Third Tube of the Lincoln Tunnel by The Port of New York Authority during the period January 15, 1955, to June 23, 1956. This was a shield-driven tunnel extending eastward from Weehawken, New Jersey, to New York City.

The shield had a diameter of 32 feet and was driven forward by massive hydraulic jacks, each push measuring 32 inches. This process was repeated 2131 times, the total distance involved being 5486 feet. This was accomplished by gangs of sandhogs working around the clock, 24 hours a day, six and sometimes seven days a week, and under pressures that went as high as 34 pounds per square inch gauge (P.S.I.G.)* The men worked in close quarters at hard manual labor either behind or in front of the shield, with irregular and often poor footing, in damp, water-

Material gathered in collaboration with our colleagues at the Lincoln Tunnel Third Tube Project, MICHAEL WULWICK, M.D., FRANCIS X. REYNOLDS, M.D., STEPHEN SUGAAR, M.D., SAMUEL J. MEGIBOW, M.D.

*Absolute pressure = gauge pressure + atmospheric pressure (e.g., +14.7 lbs.).

dripping areas and under conditions that are considered properly to be hazardous. Also exposed regularly to the compressed air were the corps of engineers, carpenters, electricians, safety engineers, and others who functioned on this construction job.

Past experience in compressed air construction was such that insurance costs rose to a prohibitive figure. In this case, The Port Authority was self-insured and the medical management of this project became the exclusive responsibility of The Port Authority Medical Department.

Almost two years of preparation preceded the actual onset of operations. The prime objective was to minimize, and if possible eliminate, every medical hazard normally associated with previous compressed air work. Owing to the high risks and resultant high costs of compressed air illness, with its concomitantly high insurance rates, it became necessary to entertain an entirely new concept. The employer, therefore, became his own insurer and was then able to devote himself fully and unselfishly to the improvement of the health and safety of the workers.

To handle the medical aspects of this job, an extremely well-equipped and well-manned medical building was set up by and under the complete supervision of The Port of New York Authority. This was unique in the history of compressed air tunnels. It consisted of a spacious separate building, 3000 sq. ft. in size, located at the entrance to the work shaft. To man this extensive physical setup, there were four doctors on duty six hours a day around the clock, a nurse on duty 24 hours a day, a laboratory technician, x-ray technician, and a secretary. Accurate and detailed daily medical records were kept and statistics compiled periodically as the job progressed. Medical coverage was maintained for compressed air illness even on nonworking days. In addition, a medical lock for the treatment of compressed air illness was maintained in the building and all medical personnel were trained in its use. This consisted of a large metal tubular chamber divided into two sections, each of which could be controlled separately for use as a decompression chamber and for treatment of compressed air illness. Each was fully equipped with the latest and most modern methods of therapy, including gauges inside and outside, tanks of oxygen and of helium and oxygen, explosion-proof electrical heaters, and explosion-proof bully eyes for vision.

Prior to being permitted to work in compressed air, every man had to pass a stringent medical examination, with emphasis on the special aspects of compressed air work, careful attention being given to the ear, nose, throat, heart, lungs, joints, and urine.

Having passed this physical, the applicant was then tested in the medical air lock by the physician. He was subjected to pressure equal to that being used in the tunnel at the time (15 - 35 P.S.I.G.) to see if he could adjust satisfactorily. The ear drums were carefully inspected, the patient having been instructed previously in the Valsalva maneuver for clearing his ears when they blocked. Then and only then was the applicant allowed to go into compressed air. Furthermore, every man who had never been in compressed air previously was given another checkup at the expiration of his first work shift to observe any untoward effects.

The entire working population of the Lincoln Tunnel (Third Tube) exposed to compressed air was given a thorough examination every two months to determine continued suitability for compressed air work. Every man who was out of work for three days for any reason was rechecked by the Medical Department before being allowed back to work; and a re-examination was necessary for any and all workers who had not been in compressed air for 10 days or more regardless of the cause.

COMPRESSED air was first turned on January 17, 1955. All told, 138,034 decompressions were performed. This involved a constantly changing worker population that equaled approximately 300 men at any one time. A total of 44 cases of acute decompression illness were encountered and treated at our medical installation. This represents a percentage of .0318%, or 3.18 cases per 10,000 decompressions (Table I).

TABLE I.

Decompressions	Bends	Percent
138,034	44	.0318

The first case occurred on December 23, 1955, some 11 months and some 76,000 decompressions after the compressed air was begun. The gauge pressure did not exceed 15 P.S.I.G. for this period, which confirms the clinical experience of other investigators — that cases of decompression illness are uncommon below a gauge pressure of 15 P.S.I.G.

It was a matter of considerable interest to us to analyze the factors involved in the occurrence of these 44 cases of compressed air illness. There were a total of 832 individual preplacement examinations. Of these 704, or 84.61%, were accepted and 110, or 13.22%, rejected; while another 18, or 2.17%, for miscellaneous reasons did not finish the examination. We feel that this is a high percentage of workers accepted, particularly considering the stringency of the examination. However, our purpose was to provide a worker population suitable for this particular type of occupation, and our doctors were trained and experienced in recognizing which disabilities were and which disabilities were not reconcilable with compressed air work (Table II).

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TABLE II.
ANALYSIS OF WORKER POPULATION

Total Number of Men Examined	832
Total Number of Men Accepted	704, or 84.61%
Total Number of Men Rejected	110, or 13.22%
Did Not Finish Examination	18, or 2.17%

TABLE III.

Presenting Site of Symptoms	Number of Cases	Percent of Cases
Upper Extremity	12	27.27
Lower Extremity	25	56.82
Both Extremities	5*	11.37
Abdomen	1	2.27
Nausea	1	2.27
Total	44	100%

*One case also had generalized itch.

The majority of the 44 cases presented symptoms relating to one or more extremities (Table III). The upper extremities were indicted in 12 cases, or 27.27%; while the lower extremities were involved in 25 cases, or 56.82%. Five patients, or 11.37%, had pain in both lower and upper extremities as a presenting symptom. One of these five cases also had a generalized itch. Only one patient, or 2.27%, evinced clinical abdominal distress, and one other patient, or 2.27%, had nausea as his primary symptom. It was encouraging for us to note as the job progressed that the majority of cases were limited to the extremities since these presented fewer problems in therapy. It was our opinion that the careful selection of workers and the comprehensive medical control of the working conditions in routine decompression schedules used on the job were strong contributory factors in both the low incidence and lack of severity of the compressed air cases.

An attempt was made to analyze the gauge pressures at which the cases occurred. As noted in Table I, there was a total of 138,034 separate decompressions, with an incidence of .0318. This figure is far and away the best ever reported, and considerably less than had been feared or anticipated.

The men worked two three-hour shifts per day with a rest period of three hours when the pressure was maintained up to 22 P.S.I.G. At this pressure range, five cases, or 11.37%, occurred (Tables IV, V, and VI). Four of these took place at 20 P.S.I.G., and one at 18 P.S.I.G. No cases occurred below 18 P.S.I.G., which is in accord with the best previous opinions on the subject, namely, that the occurrence of "bends" is rare under 15 P.S.I.G.

Between 22 and 30 P.S.I.G., the men worked two shifts per day of two hours duration each, with a rest period of three and a half to four hours. At this level, there were 35 cases, or 79.54%, of compressed air illness, every one of which occurred between 28 P.S.I.G. and 30 P.S.I.G. No brief is made for the concentration of "bends" in the narrow range, except to note that the pressure was at the upper limits of its 22-30 P.S.I.G. range.

When the pressure was raised above 30 P.S.I.G., the men were placed on a two-shifts-a-day schedule, one and a half hours per work shift, with a rest period of five hours. Four cases occurred, or 9.09%, all of them mild and therefore easily treated.

Another evaluation of considerable interest was the question of lapse of time between leaving the decompression chamber after a work shift and the onset of the presenting symptom (Table VII). It was found that three cases, or 6.81%, had pain immediately on leaving the work lock, or decompression chamber. Two of the cases involved both knees and one case involved the right knee. Eight other cases, or 18.18%, had an onset of symptoms within 30 minutes after leaving the work lock. Five cases, or 11.37%, occurred within 60 minutes; while four cases, or 9.09%, had pain within a 90-minute period. Before two hours had elapsed, six other cases, or 13.64%, had presenting symptoms; whereas seven cases, or 15.91%, took place within three hours after leaving the work lock. Within four hours, there were five cases, or 11.37%; and four cases, or 9.01%, occurred within four to eight hours after leaving the decompression chamber. There was one delayed case, or 2.27%, whose presenting symptom appeared between 12 and 24 hours after leaving the compressed air chamber. There was one patient who was extremely uncooperative and no adequate history was available.

It can be seen then from Table VII that 25% of all the cases had symptoms which appeared before 30 minutes had elapsed after leaving the decompression chamber; while more than half, or 59.09%, of the cases had symptoms which

TABLE IV.

P.S.I.G.	Number of Cases of Decompression Illness	Percent of Cases
0 - 16	0	00.00
16 - 22	5	11.36
22 - 30	35	79.54
30 - 35	4	9.10
Total	44	100%

TABLE V.

P.S.I.G.	Number of Shifts Worked Per Day	Duration of Work Shift	Rest Time Between Work Shifts
0 - 16	2	3 hours	3 hours
16 - 22	2	3 hours	3 hours
22 - 30	2	2 hours	3½ - 4 hours
30 - 35	2	1½ hours	5 hours

TABLE VI.

P.S.I.G.	Number of Cases of Decompression Illness	Percent of Cases
0 - 16	0	00.00
16 - 19½	1	2.27
20 - 27½	4	9.09
28 - 30	35	79.54
30 - 35	4	9.09
Total	44	100%

TABLE VII.
DURATION OF TIME BETWEEN LEAVING WORK LOCK AND ONSET OF SYMPTOMS

Time	Number	Percent
Immediate	3	6.81
30 min.	8	18.18
60 min.	5	11.37
90 min.	4	9.09
120 min.	6	13.64
180 min.	7	15.91
240 min.	5	11.37
4-8 hrs.	4	9.09
8-12 hrs.	0	—
12-24 hrs.	1	2.27
Miscellaneous*	1	2.27
Total	44	100%

*Uncooperative.

evinced themselves before two hours had elapsed. All but six of the cases, to include the uncooperative patient in this figure, had presenting symptoms before four hours time. Each of the five remaining in the last category came in with mild symptomatology limited to the extremities. All were easily treated — only three requiring recompression. The other two cases subsided rapidly with conservative therapy. From our experience, therefore, almost 90% of the cases which occurred had symptoms which presented themselves within four hours after leaving the decompression chamber, and none of the cases occurring after that time required more than the simplest therapy.

A constant check was maintained on the routine decompression schedules which were in operation at the work site. These schedules were made up with the cooperation of the United States Navy and covered all pressures to which the workers were subjected. Separate schedules were figured out for each level of pressure and for each work shift, taking cognizance of the difference in nitrogen absorption between the first and second work shifts. A three-stage decompression was used routinely, and, for example, after the first work shift at 20 P.S.I.G., the total decompression time was 9½ minutes; whereas, after the second shift at the same pressure, the total decompression time was 14½ minutes. Similarly at 34 P.S.I.G., the total decompression time after the first work shift was 25 minutes; whereas, after the second work shift at the same pressure, total decompression time was 42 minutes. These tables will show that they follow Halden's 2-1 Rule, namely, that you can always halve the pressure without causing symptoms. This method of decompression was used 138,034 times, and only 44 instances of symptomatology were reported to us.

The treatment schedules were also drawn up with the valuable assistance of the United States Navy (Table VIII). This treatment schedule is detailed and specific in its analysis of indications and therapy. However, as in any other problem in

TABLE VIII.
TABLE OF RECOMPRESSION TREATMENTS FOR DECOMPRESSION SICKNESS

Compress 10 lb/min. Decompress 1 min. between stops	"BENDS" — PAIN ONLY				SERIOUS-SYMPTOMS	
	Pain relieved at Pressures Less than 30 lbs. Use Column 1A if O_2 is not available.		Pain relieved at Pressures Greater than 30 lbs. Use Column 2A if O_2 is not available. If pain does not improve within 30 min. at 75 lbs., the case is probably not bends. Decompress according Column 2 or 2A.		Serious symptoms include any one of the following: 1. Unconsciousness 2. Convulsions 3. Weakness or inability to use arms or legs 4. Any visual disturbances 5. Dizziness 6. Loss of speech or hearing 7. Severe shortness of breath or "chokes"	
					Symptoms Relieved within 30 minutes at 75 lbs. Use Column 3	Symptoms Not Relieved within 30 minutes at 75 lbs. Use Column 4
STOPS	TIME IN MINUTES UNLESS OTHERWISE INDICATED.					
P.S.I.G.	1	1A	2	2A	3	4
75			30 (Air)	30 (Air)	30 (Air)	30 to 120 (Air)
65			12 (Air)	12 (Air)	12 (Air)	30 (Air)
55			12 (Air)	12 (Air)	12 (Air)	30 (Air)
45	30 (Air)	30 (Air)	12 (Air)	12 (Air)	12 (Air)	30 (Air)
35	12 (Air)	12 (Air)	12 (Air)	12 (Air)	12 (Air)	30 (Air)
25	30 (O_2)	30 (Air)	30 (O_2)	30 (Air)	30 (O_2 or Air)	6 Hrs. (Air)
22	30 (O_2)	30 (Air)	30 (O_2)	30 (Air)	30 (O_2 or Air)	6 Hrs. (Air)
18	30 (O_2)	30 (Air)	30 (O_2)	30 (Air)	30 (O_2 or Air)	6 Hrs. (Air)
14	5 (O_2)	60 (Air)	60 (O_2)	2 Hrs. (Air)	12 Hrs. (Air)	First 11 Hrs. AIR Then 1 Hr. O_2 or AIR
8	5 (O_2)	60 (Air)	5 (O_2)	2 Hrs. (Air)	2 Hrs. (Air)	First 1 Hr. AIR Then 1 Hr. O_2 or AIR
4	5 (O_2)	2 Hrs. (Air)	5 (O_2)	4 Hrs. (Air)	2 Hrs. (Air)	First 1 Hr. AIR Then 1 Hr. O_2 or AIR
0	5 (O_2)	1 Min. (Air)	5 (O_2)	1 Min. (Air)	1 Min. (Air)	1 Min. (O_2)

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TABLE IX.
NUMBER OF CASES TREATED WITH RECOMPRESSION

Conservative Treatment	12,	or 27.28%
Recompression Therapy	31,	or 70.45%
Miscellaneous*	1,	or 2.27%
Total	44	100.00%

*Uncooperative, refused therapy.

medical therapeutics, much is left to the clinical judgment of the medical observer. In this type of case, as in any other, there is no substitute for experience and a sound clinical judgment is essential and invaluable in properly evaluating the symptomatology and diagnoses involved, and then following logically with the proper therapy. As can be noted, recompression to 45 P.S.I.G. is required in Schedule 1 and 1A; whereas, Schedules 2, 2A, 3 and 4 require recompression to 75 P.S.I.G. before beginning stage decompression therapy.

The use of oxygen or a mixture of oxygen and helium substantially reduces the treatment time, and this was done wherever it was practicable. In our experience it was never found necessary to use other than Schedules 1 or 1A, which speaks well for the relative mildness of the cases encountered and for the excellence of the decompressions schedules used on the job.

Twelve of the cases, or 27.28%, were treated conservatively without the use of any recompression (Table IX). The remainder of the cases were treated with recompression according to the 45-lb schedule or variations thereof. Only two patients required hospitalization for further observation. There were no deaths attributable to compressed air in this entire operation, nor is there evidence thus far of any permanent disability resulting from exposure to compressed air at the time.

Comment

FROM AN over-all point of view it appears that much benefit was derived from the establishment of a thoroughly equipped and well staffed medical station directly on the job site, under the complete supervision and control of the Medical Department of The Port of New York Authority. This made possible a close follow-up of the working conditions and adherence to the decompression schedules at the work lock and was of immense value in the uplift of worker morale. A careful screening of the applicants for compressed air work was a major factor in the unprecedentedly low incidence of "bends," .0318%. In other words, for every 10,000 decompressions there were 3.18 cases of "bends." The largest number of cases in any range of pressure was found to be in the upper levels, e.g., at 20 P.S.I.G. and 28 P.S.I.G. The 44 cases, in general, were considered to be relatively mild in nature and this is attributable to the excellence of the working decompression schedules. The treatment was handled under the established United States Navy schedules and only two patients required hospitalization. There were no deaths or crippling disabilities.

Summary

FORTY-FOUR cases of acute compressed air illness occurred in 128,034 decompressions presented, which were incurred in the process of building a shield-driven compressed air tunnel under the Hudson River. Emphasis is placed on the careful selection and preplacement examination of the workers as well as the unique character of the medical control by the Medical Department of The Port of New York Authority. The work schedules and treatment schedules are presented. The aim of the Medical Department's program was the prevention of compressed air illness. The most modern methods of therapy were made available on the job site.

It is our belief that, given a careful preemployment screening and physical examination, adequate proper schedules of work time and decompression time, and full cooperation between labor, management and the Medical Department, acute decompression illness can virtually be eliminated as a hazard in future compressed air work.

(111 8th Avenue.)

References

BEHNKE, A. R.: Decompression Sickness. Oxford Medicine (Christian) 4:2, 1948.

DUDLEY, S. F.: Caissons Disease. British Encyclopedia of Med. Practice. Rolleston (London 1936, Vol. 2).

ANDERSON, YANDELL, and HAGGARD: Diseases Due to Variations in Atmospheric Pressure; Caissons Disease and Mountain Sickness. Cutting; Nelson's New Looseleaf of Medicine, Vol. 2.

HILL, L.: Caisson's Sickness and the Physiology of Work in Compressed Air. Longman's Green, London, 1912.

KEAYS, F. L.: Compressed Air Illness with a Report of 3692 Cases. Medical Department Publication; Cornell Univ. Med. Collection, October, 1909.

LEVY, E.: Compressed Air Illness and Its Engineering Importance. Washington. Government Printing Office, 1922, Tech. Paper 285.

NATIONAL RESEARCH COUNCIL: Subcommittee on Decompression Sickness. W. P. Saunders Co., 1951.

THORNE, I. J.: Caissons Disease — Observation & Report of 300 Cases at the Queens Midtown Tunnel Project, 1938-1940. Address delivered to Staff of Broad St. Hosp. & Pan American Med. Soc., NYC 4/26/40.

AIR FORCE MANUAL 160-30: Physiology of Flight, 1953.

PATON and WALDER: Compressed Air Illness — An Investigation During the Construction of the Tyne Tunnel 1954. Great Britain, Med. Research Council — Special Report Series, London, 1954, No. 281.

SIEVERS: Carbon Monoxide Exposure in Holland Tunnel. *Public Health Bulletin*, 278. Washington, 1942.

KAHLSTROM, BURTON, PHEMISTER: Aseptic Necrosis of the Bone, Part 1. *Surg., Gynec. & Obst.*, 68:2 (February 1) 1939.

TAYLOR, H. K.: Aseptic Necrosis in Adults — Caisson Workers and Others. *Radiology*, 42, 1944.

BELL, EDSEN, HORNICK: Characteristic Bone and Joint Changes in Compressed Air Workers; A Survey of Symptomless Cases. *Radiology*, 38, 1942.

Single Frequency Screening Technique —A Test of Its Validity

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RAPID TESTS of hearing are in demand in industrial and military situations. These tests might be realized, for limited use, if we could find adequate justification for testing fewer frequencies than are now required for standard audiometric tests. Reducing the number of test frequencies reduces the time needed to administer a hearing test. Time thus saved can be used to extend the test to more persons, to allow more time for discrete frequency threshold audiometry where needed, and to permit persons to be retested at more frequent intervals. Industry is favorably disposed to any effort that saves time and lessens the hours spent away from productive labor.

The single frequency screening technique has been proposed as a means of giving such rapid screening tests of hearing. The technique is based on two related findings that have come out of the attempts to devise quick yet effective methods of testing hearing ability. These findings are: (1) intense industrial noise tends to cause earlier and greater hearing loss at 4000 cycles per second than at other frequencies[1,2,3,4] and, (2) an individual's hearing loss at 4000 cycles per second is, in the majority of cases, larger than his loss at lower frequencies. This suggests that tests of hearing at 4000 cycles per second might be used not only to detect the onset of noise-induced hearing loss, but in addition, by successive or serial testing, to monitor hearing in the speech frequencies (500, 1000, and 2000 cps).

The present study was undertaken to check the validity of testing hearing with the 4000 cps tone at intensity levels of 15 db and 35 db as a means of predicting the upper limits of hearing losses at frequencies below 4000 cps. We attempted to determine whether a person who responded to the 4000 cps tone would be able to hear equally as well or better at frequencies below 4000 cps.

It was felt that this condition had to be met in a relatively high percentage of the test cases if the 4000 cps screening test was to have real value as a method of recheck testing for the industrial population.

The Study

TEST SAMPLE. The persons tested were 220 employees from various departments in a heavy industry plant. They ranged from 18 through 65 years of age; and included office personnel who worked in relatively quiet areas, and employees who worked in areas where over-all noise levels approached and exceeded 100 db sound pressure level re 0.0002 dynes/cm^2. No attempt was made to select particular individuals. The employees tested were those regularly scheduled for their annual hearing recheck.

TEST PROCEDURE. The testing was carried out as part of the company's routine recheck testing program. Each employee in the test sample was tested twice: first with a single frequency screening test at 4000 cps, and immediately thereafter with a discrete frequency air conduction threshold audiometric test. All tests were performed before the employees reported for work on the test day so that the audiograms would not be contaminated with temporary threshold shifts.

The Single Frequency Screening Tests. The single frequency screening tests were performed in a personnel office. The room had not been sound treated; over-all sound pressure levels, measured on the "C" scale of a General Radio Sound-Survey Meter (Model 1555-A), varied between 60 and 65 db depending upon which plant operations were in action during the noise measurements.

An Oto-Chek (Model 700)* was used for the single frequency screening tests. The instructions and test procedure were as follows:

1. The employee was instructed to listen for a high tone and to respond when he heard it by raising a finger — the right forefinger if the tone was heard in the right ear and the left forefinger for the left ear.

2. The employee was then seated so that he could not see either the technician or the Oto-Chek. Binaural earphones were placed over his ears.

3. The 4000 cps tone was presented to one ear at a sound pressure level of 15 db re audiometer zero. The right and left ear were alternately

*A. M. Brooks Co., Inc., Los Angeles, California.

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tested first. If the worker responded to the tone, it was so recorded. If he did not respond, the 4000 cps tone was presented to the same ear at a sound pressure level of 35 db re audiometer zero. Response or lack of same was recorded.

4. Step 3 was repeated for the worker's other ear.

The Discrete Frequency Air Conduction Threshold Tests. These tests were performed in a specially constructed, sound-treated room which permitted satisfactory performance of threshold audiometry. The testing was conducted as part of a routine, medically-supervised hearing conservation program. A properly calibrated Maico (Model H-1) pure tone audiometer was used. The instructions and the test procedure were as follows:

1. The employee was instructed to lift his finger whenever he heard a tone, to keep his finger raised as long as he heard the tone, and to lower it when the tone was no longer audible. He was to use his right forefinger for the right ear and his left forefinger for the left ear.

2. The employee was so seated that he could see neither the control panel of the audiometer nor the technician.

3. The worker's threshold was determined and recorded for each ear at these frequencies and in this order: 1000, 1500, 2000, 3000, 4000, 6000, 8000, 1000, 500, 250 cycles per second.[5] The right and left ear were alternately tested first and the modified ascending technique of measuring thresholds was used.

The employee was released for work after he had completed both the single frequency screening test and the discrete frequency threshold test.

Test Results. The results of the two tests were compared for each worker so that we could determine whether the magnitude of the loss at 4000 cps (as indicated by the response to the 4000 cps screening test) was larger than the hearing losses measured at lower frequencies. The results of the comparison of the two tests are reported in Table I. Six ears (in six workers) of the 440 ears tested had, at frequencies below 4000 cps, more loss than was registered at 4000 cps by the single frequency screening test.

In other words, in 98.6% of the ears tested in this industrial group (97.3% of the workers tested) the measured hearing losses at frequencies below 4000 cps were not greater than the 4000 cps loss as indicated by the single frequency screening test.

TABLE I

Total number of ears tested	Number of ears that showed no greater losses at frequencies below 4000 cps than the response to the 4000 cps screening test.	Number of ears that showed greater losses at frequencies below 4000 cps than the response to the 4000 cps screening test.
440	434 (98.6%)	6 (1.4%)

Comment and Conclusions

EARLY noise-induced hearing loss usually occurs at frequencies in the region of 4000 cycles per second. The auditory response to this single frequency should, therefore, help us to detect early significant changes in hearing caused by exposure to noise.

The findings of this study support previous reports[1,2,4] that the 4000 cps single frequency screening test is an accurate test for establishing the upper limit of hearing losses at frequencies below 4000 cps. This technique is adequate, therefore, for monitoring hearing losses in the speech frequencies.

We conclude that the single frequency screening test is a valid and reliable method for recheck testing of industrial populations. Further study, however, may establish the advisability of screening at closer intervals of intensity levels rather than at the fixed intensity levels of 15 db and 35 db as was done in this study.

We emphasize that this study in no way attempts to establish the use of the single frequency screening technique as the sole method of testing in industrial hearing conservation programs. *The need for complete discrete frequency threshold audiometric* PRE-EMPLOYMENT *tests is as urgent as ever.*[6]

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References

1. Subcommittee on Noise in Industry: Guide for Conservation of Hearing in Noise, Revised 1957. American Academy of Ophthalmology and Otolaryngology.

2. GLORIG, A., and HOUSE, H.: A New Concept of Screening Audiometry. *Archives of Otolaryngology*, August, 1957.

3. PERLMAN, H.: Acoustic Trauma. *Ann. Surg.*, 122:1086 (December) 1945.

4. HOUSE, H.: A New Instrument and Concept for the Rapid Detection of a Possible Hearing Impairment. Transactions of A.A.O.O., March-April 1957, Vol. 61, No. 2, 228.

5. GLORIG, A., and WHEELER, D.: Wisconsin State Fair Hearing Survey, Noise Control. November, 1955, Acoustical Society of America.

6. FOX, M. S.: Occupational Hearing Loss. *Indust. Med. & Surg.*, 25:7, 310 (July) 1956.

Costly

MORE THAN two-thirds of all industrial injuries occur in businesses with fewer than 100 workers. Small business is thus paying most of the estimated national annual cost of $2.5 billion for occupational injuries.

—EDWARD T. DICKENSON, N.Y. State Commerce Commissioner.

The Cardiac in New York City's Transit System

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AS A RESULT of recent symposia on "The Cardiac in Industry,"[1] and "Medical Aspects of Motor Vehicle Accident Prevention,"[2] it was decided to review the special problems that cardiac employees present in the New York City Transit System.

The New York City Transit Authority is a semi-independent unit, created by an act of the New York State Legislature, and it has a great responsibility to the riding public of the City of New York. It is absolutely essential that the welfare and safety of the people of the city, who use the buses and subways, supersede all other factors in the consideration of the employability of cardiacs in certain job categories.

The employees of the New York City Transit Authority can be divided roughly into operating, maintenance, and clerical personnel. There are approximately 40,000 employees in occupations ranging from clerical jobs (25%) to heavy labor (75%). It is the latter group, consisting of bus and train operators, mechanics, trackmen, conductors, and maintenance personnel that presents a special problem. In addition, these employees have civil service status and therefore must be utilized once they have received permanent appointment, but not necessarily in their title. This is applicable if they have had three years or more of service. Seniority also presents a special problem. Seniority is lost by an employee who has to be reclassified for a condition which did not arise out of or in the course of employment. This at times is a hardship which cannot be remedied. However, in private industry, an employee who cannot be employed at his former assignment, after having sustained a myocardial infarction, often finds himself replaced.

The Transit Authority Medical Department establishes and maintains standards for pre-employment, periodic, and promotion examinations, and provides treatment for service-connected injuries and illnesses. Periodic examinations are conducted once a year for every motorman and surface line operator over the age of 50 years, and every two years for those under the age of 50 years. Towermen, conductors, trackwalkers and signal maintainers are examined periodically, not more frequently than once every five years. However, if the Medical Department finds that an employee has a condition that requires more frequent examinations, these are scheduled accordingly. A department head may request that an employee be examined at any time for a valid reason.

In addition, any employee who has been ill for 21 days or more, or has been hospitalized, receives a complete physical examination prior to his return to work. Cases of heart disease with absences of any duration are examined before return to work. Thus, in addition to case findings by the Transit Authority Medical Department, the employee's own physician is of aid in identifying the seriously ill employee.

One of the many objectives of the periodic examination is to locate and screen the employees with hypertension and cardiovascular disease so that early diagnosis of illness and prompt medical care will assure uninterrupted service of transit facilities. These employees may have no medical complaints and no apparent symptoms, yet in 10% of those examined evidence of cardiovascular disease or hypertension was found. The employee is referred by the examining physician in the several clinics maintained by the Transit Authority to the central clinic where blood tests, chest x-ray, electrocardiogram, and urine analysis are done, and the employee re-examined and his case reviewed before final disposition is made. Where indicated, the two-step exercise electrocardiograph test is done.[3]

Once the employee is definitely found to be a cardiac or hypertensive, careful re-examination at regular intervals is made; usually at the central clinic. Operating personnel are ordinarily not permitted to continue in their assignment. This safeguards the health and safety of the worker as well as enabling him to remain on a job and do productive work. In addition, he is advised to see his physician for further diagnostic and therapeutic measures wherever indi-

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cated. Close cooperation is maintained between the private physician and the Transit Authority Medical Department.

The type of heart disease, symptoms and signs, the degree of myocardial reserve, the presence of other illnesses, are all considered before the employee is reassigned to other duties. The term "light duty" is avoided, as it is meaningless. The cardiac employees in the Transit Authority do eight-hour shifts of productive work. The work restrictions are specific — and pertain to limitations on lifting, walking, stair climbing, and ability to operate a bus or train. These restrictions may be temporary or permanent. Although many workers claim that the operation of a bus or train is less strenuous than so-called "restricted assignments," the safety of passengers, the general public, and other employees, and the protection of property are the prime considerations.

In making a recommendation for the employee's work assignment, an attempt is made to avoid needless physical restrictions. This minimizes the development of anxiety on the part of the employee, and at the same time enables maximum utilization by the Transit Authority, of the worker's experience and his special training. The restrictions are similar to those used in other industries.[4] The decision as to the specific work assignment is made by the employee's department and must conform with the recommendations of the Medical Department. When there is a question as to an assignment in a particular job situation, the Medical Department is consulted for a more detailed recommendation to see if the employee is capable of filling the job. Emphasis is placed on what the employee can do, rather than on the negative aspects of his job assignment. If the employee cannot be used by his department, he is reassigned to another department in a different job category. The assignment is based on the desire to help the employee's ultimate physical condition by rendering the job less strenuous.

The Survey

THE SURVEY covers 455 employees of whom 422 were proved to be cardiacs and/or hypertensives seen in the past year (February, 1956 through January, 1957) as studied in consultation at the central clinic of the Transit Authority. It does not represent all the known cardiacs on restricted or full-duty status. There may be many employees who have cardiac disease in whom a diagnosis was made prior to 1956. These were re-examined at the various Transit Authority clinics, but not referred to the main clinic. In view of this fact, the exact incidence rate cannot be determined. However, a survey in another industry[4] has revealed an incidence rate of 7%. The average age of males is 50⅓ years, of females 62 years. Females comprise 4% of the total employees of the Transit Authority, but only 1.2% of the cardiacs examined.

Table I breaks down the 422 cases according to the type of heart disease, absenteeism, and present employability status. Arteriosclerotic heart disease was diagnosed in 194, hypertensive cardiovascular disease comprised 41% of the total, and rheumatic heart disease 5.7%. Approximately 36% were returned to full-duty status. Of the 49% on restricted duty, about two-thirds

TABLE I.
ANALYSIS OF CASES OF HEART DISEASE — 1956

	Total	No. of Cases	A.S.H.D.	H.H.D.	R.H.D.++	Miscellaneous+
Number of Cases	422		194 (45.8%)	172 (41%)	32 (7.6%)	24 (5.6%)
Females		5	0	2	1	2
Males		417	194	170	31	22
Full Duty	151					
Oper. Personnel		75	19	44	10	2
Maintenance		27	11	14	1	1
Clerical		49	18	15	10	6
Restricted Duty	207*					
Oper. Personnel		142	67	62	5	8
Maintenance		54	31	15	4+++	4
Clerical		11	8	3	0*	0
Employees with Absence	197		90	74	18	15
Disability - Retirement	31					
Operating Personnel		20	14	5	1	0
Maintenance		9	4	2	0	3
Clerical		2	1	1	0	0
Deceased	28					
Oper. Personnel		19	16	3	0	0
Maintenance		2	0	1	1	0
Clerical		7	2	5	0	0
Still Off	5		3	2	0	0
Average Duration of Absences (days)		84.5	86	83	57	79

+ Thyrotoxic heart disease, 6; aneurysm of the aorta, 3; cor pulmonale, 5; Wolff, White-Parkinson Syndrome, 1; A.S.H.D. with carotid sinus hypersensitivity, 1; pericarditis, 2; chronic glomerulonephritis with H.H.D., 2; beri-beri H.D., 1; H.H.D. with cerebrovascular accidents, 3.

* 70 employees were reclassified: 25 operational to clerical duties; 37 operational to maintenance duties; two maintenance employees to clerical duties; six maintenance men to other maintenance categories.

++ Two employees had commisurotomy; one returned to full duty and one to restricted duty.

+++ One employee died in March, 1957, following attempted commisurotomy.

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TABLE II.
AGE AND HEART DISEASE

Length of Service (Years)	Age in Years						
	20-29	30-39	40-49	50-59	60-69	70	Total
Under 1							
1 - 3		1	1	2			4
4 - 9	1	11	19	3	4		38
10 - 15		4	24	14	2		44
16 - 19			8	11	4		23
20 - 24			13	40	14		67
25 - 29			7	47	20		74
30 - 40			4	79	62		145
41 - Over					25	2	27
					Total		422

TABLE III.
ACUTE CORONARY THROMBOSIS — 1956

TOTAL CASES		139+
Deceased	24 (17%)	
Died in acute attack	14*	
Died within 10 days	6	
Died within 4-8 weeks	4	
Retired for disability	6	
Returned to work	106	
Full Duty		
Operational	13**	
Maintenance	3	
Clerical	19	
Restricted Duty		
Operating	51***	
Maintenance	15	
Clerical	5	
Still Absent	3	
Average duration of absence (days)		106

+Five employees sustained two attacks each.
*Three employees died while on duty.
**Two employees died following a second coronary attack.
***One employee on restricted duty died following a second coronary attack.

were retained in their regular work, while the others were transferred to different jobs.

Table II shows employees who have cardiac pathology, according to age and length of service. It can be noted that the older employees with high seniority are most frequently involved. This is at a time when they are most useful to the Transit Authority in terms of years of employment and work experience.

Table III summarizes our experience with cases of acute myocardial infarction. During the one-year survey, there were 24 deaths out of the 139 cases, a rate of 17%. Of these cases 12 had no previous contact with the Medical Department except for pre-employment and periodic examinations. Only three died while on duty. The majority of acute coronary cases returned to work, and only 4% were retired for disability. The average length of absence was 106 days. The high percentage of employees with acute coronary thrombosis who returned to work indicates that such patients can resume productive work. The date of return to full or restricted work is usually decided upon after consultation with the family physician, the employee, and the Medical Department. If symptoms of angina are absent or minimal, and there is stabilization of the infarction as shown by laboratory and electrocardiographic findings, the employee is considered for return to duty. Usually, he is returned to restricted duty. Then after repeated frequent follow-up studies and examinations, he may be considered for return to full duty. At times a trial of work may be the only way to evaluate work capacity. This last procedure is not applicable for operational personnel.

DURING this period of study two employees have made claims that the cardiac condition arose out of and in the course of employment. These cases are still pending. A short abstract of these follows:

S.M. — A 35 year old turnstile maintainer, was struck by a wooden door across the left chest, upper left abdomen, and left shoulder. He received first aid treatment at a hospital where a diagnosis of contusion of the left shoulder and left chest was made. He was place on restricted duty. Because he continued to complain of chest pain an electrocardiogram, chest x-ray, and x-ray of the left shoulder were taken. The reports indicated a possible strain of the capsule of the left shoulder and eventration of the left leaf of the diaphragm, with displacement of the heart to the right. The electrocardiogram was at first interpreted as myocardial damage, but when a subsequent electrocardiogram was normal within a few days, the first electrocardiogram was re-examined and diagnosed as a case of Wolff-White Parkinson syndrome. Numerous electrocardiograms have shown the frequent shift in conduction pathways. The employee's physician has testified that the eventration and the Wolff-White Parkinson syndrome were caused by trauma. It is our opinion that these findings have no relationship to the trauma the employee sustained.

L.C. — The second case: A trackman allegedly received a blow on the left chest from the handle of a welding machine. He continued to push the machine on the tracks, and then experienced sudden fatigue, dyspnea, and tightness across the chest. He rested for about five minutes, then returned to work, and received several more blows which necessitated cessation of work for rest periods. At the end of his tour of duty, the employee experienced severe precordial pain and almost collapsed. This subsided after several minutes, and then he noticed a residual "ache" and "tight" sensation in the chest. He went home, and was hospitalized by his physician for two weeks. At present, one month after the episode, he has retrosternal distress and dyspnea on stair climbing or climbing a hill. Blood pressure, pulse, chest x-ray are normal. The electrocardiogram is compatible with inferior wall ischemia. The Medical Department is of the opinion that this condition arose out of and in the course of employment, if the employee's history is accurate as reported.

The history and findings are suggestive of coronary insufficiency. The employee was returned to restricted duty (off tracks, no pushing or heavy lifting) pending study of the hospital records and of the electrocardiogram taken by his physician at the time of the injury.

Four cases, in which causal relationship had been established by Workmen's Compensation Board rulings were also examined. Two involved

bus operators. One of these (J.F.) sustained a coronary infarction soon after an unusual effort in an attempt to maintain the bus on the road. He has made a complete functional recovery. The most recent electrocardiogram fails to reveal any evidence of residual myocardial damage.

A second bus operator (J.N.) sustained a contusion of the chest when thrown against the steering wheel while trying to avoid an accident on April 10, 1956. He sustained an anteroseptal infarction. On July 5, 1956, he had only minimal evidence of anterior wall damage, but because of persistence of mild angina and dyspnea, he was not returned to duty until July 16, 1956. At present, he is on restricted duty, does not operate a vehicle, and is not permitted to do heavy lifting.

The third case (J.G.) involves a turnstile maintainer who sustained an anteroseptal infarction after trying to remove an allegedly stuck fare box from a bus. This occurred in November, 1953. He has mild precordial and retrosternal pressure and dyspnea on climbing stairs. He was returned to maintenance work, but at a bench, and is not to do heavy lifting.

The fourth case involves the only employee, other than those who expired or have been retired, who has not returned to any duty. Because of the conflict of opinion in this case, it will be described in detail:

J.D. — A car mechanic, who did heavy labor in overhauling and rebuilding disabled passenger cars for the subway system, first began to experience chest pain on effort at the age of 47 in November, 1953. There was no history of unusual strain or effort, beyond that of the work he had been doing for many months. In association with the retrosternal pain, the employee noted dyspnea on effort such as stair climbing and also noticed, on occasions, chest pain, at home, while at rest. Following the onset of symptoms, he was given lighter duties, but after several days he was returned to full duty. On December 4, 1953, his physician diagnosed his condition as "heart strain" and advised modified bed rest. After 26 days of rest, he returned to work and was given sedentary duties, after our electrocardiograph revealed evidence of inferior wall damage. About a month after his return to work, while doing electrical repairing at the bench, he experienced "dizziness and weakness" and was put to bed for one week. There was no objective evidence of another infarction or of coronary insufficiency. After six weeks, he was returned to bench work, and three months later, while at work, he experienced another "attack" which was diagnosed as angina at Kings County Hospital, and after five days, when no objective evidence of fresh infarction was seen (normal sedimentation rate, white blood cells, electrocardiogram, blood pressure, pulse, and temperature) he was discharged. He has not worked since July 24, 1954. The most recent electrocardiogram, on November 21, 1956, shows the pattern of stabilized inferior wall damage.

The employee has "dyspnea" which is really a sighing respiration and vague chest pain in the region of the apex even at rest or while speaking, not related to effort and not relieved by nitroglycerine.

This employee first developed cardiac symptoms in November 10, 1953, but he was not seen by his physician till two weeks later, and the claim to establish causal relationship was not filed till six months later (May 22, 1954). It should be noted that the employee has a typical history of arteriosclerotic heart disease and coronary sclerosis, yet was awarded compensation. In May, 1955, even his own physician attempted to get him to return to some sort of sedentary work. We, as well as his physician, feel that he now has a superimposed cardiac neurosis. It is unlikely that he will return to any duty, not because of his cardiac condition, but because of subconscious as well as conscious (socioeconomic) motivation. He is at present being studied by the New York Heart Association, Cardiac Work Evaluation Clinic. It is cases such as this which deter the employment of the cardiac in industry.

The low incidence of compensation claims in the past year is due to the diligence and supervision of the Transit Authority Medical Department as well as to the cooperation of the private physicians who recognize that there is no proof that ordinary activity causes coronary or other heart disease. It should be noted that medical reports reveal that only 2% of coronary thrombosis attacks occur with severe exertion. The Transit Authority encourages consultation and examination by impartial physicians soon after admission of an employee to the hospital in an attempt to get a clear history at the earliest possible moment. "An honest history of the events that precede the cardiac insult is most essential in establishing causal relationship."[5] There have been no claims for aggravation of a cardiac condition. This we feel is due to selective job assignment and frequent re-examinations of the cardiac employee.

Comment

FROM 1953, through October, 1956, the Transit Authority Medical Department decided that no employee with arteriosclerotic and/or hypertensive cardiovascular disease should be permitted to return to work on the tracks or operate a train, bus, or trolley. The limits for hypertension were 170/100. Operating personnel who had angina pectoris or a myocardial infarction secondary to coronary thrombosis were not medically qualified to operate a vehicle or work on the tracks, and were recommended for reassignment.

Recent studies[6] on the survival of 412 patients who had sustained coronary occlusion, revealed that about 38% made a complete functional recovery (asymptomatic) and 28% had made a satisfactory recovery, but experienced angina or

dyspnea on effort. Seventy-five to 85% were employed, 60% at full-time work. It has also been pointed out that the older the patient at the time of the initial myocardial infarction the more serious the prognosis.[7] Other studies[8,9] have revealed that two-thirds to three-fourths of the survivors are able to return to moderate or complete activity after recovery from the first attack of myocardial infarction and only one-fourth were restricted in their activities. The ability to resume physical activity is the best index to prognosis after an attack of coronary thrombosis, and there is a large group of mild cases of myocardial infarction capable of long-term survival.

The problem of the employee with hypertensive cardiovascular disease, has also been analyzed in relation to his ability to operate a vehicle or engage in strenuous work. As yet, doctors do not agree as to the causes and effects of hypertension, or as to what criteria to use in defining hypertension.[10] Among the various criteria for blood pressure, the most common is that used by insurance companies — 140/90 mm Hg for the upper limits of normal values — irrespective of age and sex.[11] Many individuals have blood pressure in excess of these values, are perfectly healthy, and go through life without any evidence of cardiovascular disease.

Recent statistical analysis of blood pressure readings of 74,000 working men and women between the ages of 16 and 65, grouped according to age and sex, has thrown doubt on the validity of the figures used by the insurance companies.[12,13,14] The means of the systolic and diastolic pressures for each group have been determined, and these pressures which fall into the range of about two standard deviations (S.D.) above the mean are considered hypertensive, and those with pressures between one and two (S.D.) are considered borderline hypertensives. Thus 5% of the population will fall into the hypertensive range. The values, for males, as determined by this study show a range of 150/95 in the 20 to 24 year group to 190/110 in the 60 to 64 year age group. These values represent "statistical and not necessarily physiologic norms."[15]

Many doctors are of the opinion that essential hypertension is not a specific disease entity,[16,17,18] and that there is no sharp division between normal and pathologically high pressure. Essential hypertension may represent the "upper end of a distribution curve showing continuous variation,"[17] and thus in the older age group, it comprises half or more of the population. Arterial disease and high blood pressure are not synonymous, but the former is accelerated, and the load on the heart increased, when the pressure exceeds a certain threshold. Thus, only when cardiovascular, renal or cerebrovascular disease appears, does a problem arise in the employability of the hypertensive. In the absence of moderate to marked evidence of vascular damage to the heart, brain or kidney, many hypertensives are able to carry on for as long as 10 to 15 years on a full-duty status.[19]

In view of these findings, and after arbitration with the employees' representatives, the Transit Authority adopted new medical standards pertaining to the operating personnel. A motorman or surface line operator who is found otherwise well, but to have a blood pressure of over 175 and less than 200 systolic, with a diastolic above 100 and below 120 shall be kept under observation. If the blood pressure is 200 or over systolic, or 120 or over diastolic, the employee is to be held out of service pending further investigation, and should be returned to service only with the approval of the Medical Director. Those employees in the operating division who have suffered hypertensive cardiovascular illness are to be considered on an individual basis, and the decision as to return to duty should be based on the severity of the attack or illness, and the extent of recovery, as well as on whether the safety of the public depends on the health of such employee.

It is impossible to determine which individuals will sustain a coronary thrombosis or cerebrovascular accident. However, the physicians of the Transit Authority Medical Department are aware that those who have had a previous episode are potentially greater hazards. The recent modification of the medical standards has resulted in the return to full-duty status of a few employees who have had coronary thrombosis. These will be observed frequently by the Transit Authority Medical Department. One employee, (P.W.), a motorman who had coronary sclerosis, was recommended by his cardiologist and family physician for full duty. The Transit Authority Physicians did not concur. The next day, while at home, he died suddenly. Another employee, (J.M.), who had sustained an anteroseptal infarction a year previously and had been cleared for full duty as a bus operator, expired suddenly while collecting tolls on the sidewalk. A third employee, (J.R.), operating a bus on a stormy day, stopped the bus, but died at the wheel.

The employee who has sustained a coronary thrombosis and whose heart is not enlarged, has heart sounds of good quality, and does not have angina on effort involved in doing his work, may be permitted to continue at work. Greatest caution must be used before he is permitted to return to the operation of a bus or train. It should be recognized that recurrence is likely, regardless of what he does or whatever his occupation.[20]

Where there is a difference of opinion between the employee's physician and the Medical Department of the Transit Authority over the employee's medical ability to continue his duties

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owing to hypertensive or arteriosclerotic cardiovascular disease, the employee is sent to an impartial specialist. This physician — mutually acceptable to the Transit Authority and the employee's physician — is selected from a panel of specialists whose names have been submitted by the New York Academy of Medicine. Up to the present only a few surface line operators have been permitted to operate a bus and no motorman has been permitted to operate a train, after recovery from a myocardial illness.

Cases of inactive and recovered rheumatic, luetic and thyrotoxic heart disease are not included specifically by the new procedure, but each case is evaluated on the basis of the valvular lesions, the myocardial reserve, and the other factors previously mentioned. It should be noted that the standards used by the Medical Department of the Transit Authority are similar to those recently recommended at The New York University-Bellevue Medical Center Symposium on the Medical Aspects of Motor Vehicle Accident Prevention.[2] Those cardiovascular conditions which may cause sudden loss of consciousness or interfere with normal functions, or may cause sudden death should disqualify persons who engage in operating vehicles. In addition to hypertensive cardiovascular disease and coronary artery disease, some of these conditions are: aortic stenosis, aneurysm of any vessel, Adams-Stokes syndrome, uncontrolled fibrillation or flutter of paroxysmal auricular tachycardia, multifocal ventricular extra systoles, incomplete auriculoventricular heart block, carotid sinus hypersensitivity, and cerebrovascular disease.

The employment in the New York Transit Authority of the person who has a cardiac ailment presents many other problems. The civil service status of the employee, to which previous reference was made, complicates job reassignment. At times, the employee's motivation, especially since the illness is not service-connected, leads him to withhold symptoms. At other times, the history and symptoms may be colored in attempt to establish causal relationship. The employee opposes any change which would mean loss of pay, advancement, and seniority rights, if transferred to another job. He must be made to realize how advantageous it is to him that certain duties and positions are reserved for the safety and health of the cardiac worker. This is far more important to him than the privileges that go with seniority. At the same time seniority rights should be retained after many years of faithful service, without a loss in pay, even though thereafter no further wage increases will be possible. These problems are considered by the Transit Authority, as well as by the New York Civil Service Commission. If operating personnel who have developed cardiovascular disease could be reassigned without loss of seniority or pay, the economic pressures whether to permit them to operate a bus or train would not occur.

Another most serious problem lies in the field of liability and compensation medicine. The New York State Labor Department Workmen's Compensation Board's decision at times must be made on the basis of conflicting medical opinion. The tendency is to give the employee the benefit of any doubts created by the conflicting testimony. The threat of cardiac claims under the workmen's compensation law often is a deterrent against returning the employee to a full-duty status. This occurs as a result of court rulings that occupational strain need not be unusual or the result of heavy work if undertaken at a vulnerable phase of the disease.[5] A survey of the problem of workmen's compensation in relation to heart disease was presented before the Congress on Industrial Health in Washington in January, 1955. It was concluded that the natural progress of a disease should not be compensable, and that there is no evidence that effort or strain of a usual character which does not produce symptoms has any influence on the acceleration or aggravation of cardiovascular disease. Many compensation laws and legal decisions contrary to this concept tend to deter full and proper rehabilitation and hire of cardiac patients in competitive employment.

Summary

THE PROBLEM of the cardiac employee in New York City Transit Authority has been discussed, pertaining to job assignment, seniority and civil service status.

The safety of the riding public as well as the health and safety of the employee must be considered when the question is raised whether to permit an employee to return to work after he has suffered a coronary thrombosis.

The standards of the Medical Department of the New York City Transit Authority have been analyzed in relation to recent studies on prognosis in coronary and hypertensive heart disease.

A review of 422 cases of cardiovascular disease seen in the past year has been presented.

Of 139 coronary thrombosis, 25.2% returned to previous assignment, 51.1% were reassigned, and 23.7% did not return to work.

The incidence of compensation claims in this series of cases was 1.4%.

Present compensation rulings tend to deter the employment and utilization of the cardiac in industry.

(Two Sutton Place South — Dr. Oberman.)

References

1. Panel Discussion: "Can the Cardiac Work?" Presented at the 149th Annual Meeting of the Medical Society of the State of New York, May 13, 1955. Reprinted *New York State J. Med.*, 1427 (May 1) 1956.

2. Symposium: Medical Aspects of Motor Vehicle Accident Prevention. *New York State J. Med.*, 56:24 (December 15) 1956.

3. MASTER, A. M.: *Med. Clinic N.A.*, 34:705 (May) 1950.
4. FRANCO, S. C.: A Report of 896 Cardiac Employees. *New York State J. Med.*, 1429 (May 1) 1956.
5. SIGLER, LOUIS H.: The evaluation of claims for Workmen's Compensation in Cardiac Disability and Death. *Indust. Med. & Surg.*, 25:10 (January) 1956.
6. MASTER, A. M., JAFFE, H. L.: *J.A.M.A.*, 148:1721 (December 29) 1951.
7. CHAMBERS, W. N.: *New England Med. J.*, 235:347 (September 12) 1946.
8. COLE, D. R., SINGIAN, E. B., and KATZ, L. N.: *Circulation*, 9:321 (March) 1954.
9. WEISS, M. M.: *Am. J. Med. Sc.*, 231:9 (January) 1956.
10. GOLDSTEIN, F., JENSON, WM. K., WALDRON, J. M., DUNCAN, G. G.: The Relationship Between Hypertension and Coronary Occlusion. *Ann. Int. Med.*, 44:446 (March) 1956.
11. FISHBERG, A. M.: Differential Diagnosis of High Blood Pressure. *Med. Clinic N.A.*, 38:753 (May) 1954.
12. MASTER, A. M., DUBLIN, L. I., MARKS, H. H.: The Normal Blood Pressure Range and its Clinical Implications. *J.A.M.A.*, 143:1464, 1950.
13. MASTER, A. M., GOLDSTEIN, I., and WALTERS, M. B.: New and Old Definitions of Normal Blood Pressure. *Bull N.Y. Acad. Med.*, 27:385, 1951.
14. ROBINSON, S. C., BRUCEO: Range of Normal Blood Pressure: A Statistical and Clinical Study of 11,383 Persons. *Int. Med.*, 64:409, 1939.
15. MENDLOWITZ, MILTON: Recent Advances in Management of Hypertension. *New York State J. Med.*, 57:2, 268, 1957.
16. HAMILTON, M., PICKERING, G. W., ROBERTS, J. A. F., SOWTY, G. S. C.: The Pathology of Essential Hypertension. I. The Arterial Pressure in the General Population. *Clin. Sci.*, 13:11, 1954a.
17. PICKERING, G. W.: The concept of Essential Hypertension. *Ann. Int. Med.*, 43:1153 (December) 1955.
18. BAUER, JULIUS: The Nature of Essential Hypertension. *A.M.A. Arch. Int. Med.*, 99:47, 1957.
19. EDMONDS, R. W., FEIL, HAROLD: Cardiovascular Problems in the Railroad Industry. *Ind. Med. & Surg.*, 17:1, 7 (January) 1948.
20. SPRAGUE, HOWARD B.: Employment of Cardiacs. *Ind. Med.*, 17:8, 279 (August) 1948.

How Benefit Plans Affect the Older Worker

WHAT has the phenomenal increase in pension plans and health and insurance plans meant to the older worker? Since retirement is a rapidly approaching reality for him, pension provisions are of obvious importance. Equally important are health and insurance benefits, since the older worker is subject to chronic illness often needing costly medical care. But, observes the Bureau of National Affairs, the very fact that a job applicant is in his later years may deprive him of benefits available to younger workers. In fact, he may not be hired at all, solely because of real or fancied higher pension costs. Benefits provisions affecting the older worker have been explored in a survey by the Bureau of Labor Statistics of 300 health and insurance programs covering 1,000 or more employees — nearly five million in all. Except for life insurance and accident and sickness benefits, age attained on the job has virtually no effect on the level of benefits. Denial or reduction of benefits is more common in the case of employees hired after a specified age; but even here, 75 to 95% of older workers enjoy full coverage regardless of their age when hired. Even after retirement, a substantial minority of workers may retain all or part of their coverage. Usually, however, they must assume at least part of the cost; and benefits are reduced for a sizable fraction of those retiring. (Sickness and accident benefits, because they are based on the employment relationship, are not made available to retired workers.) In addition to its study of health and welfare programs, the Bureau of Labor Statistics analyzed 75 large pension plans covering a total of nearly three million employees. Most common eligibility requirements were that the employee must have reached age 65 and completed 10 or 15 years service. Plans covering some 30% of employees made qualification impossible for those hired after the age of 60.

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Periodic Health Examinations in the Hotel Industry

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PERIODIC health examinations are not new — as early as 1861, Dobell published in England a book entitled, "Lectures on the Germs and Vestiges of Disease, and on the Prevention of Invasion and Fatality of Disease by Periodic Examination." In this country, President Theodore Roosevelt in 1907 ordered physical examinations of all officers in the Army and Navy, and in 1914 the Life Extension Foundation offered a free health examination to policyholders of certain insurance companies. The American Medical Association in 1922 issued special forms for use by private practitioners for periodic health examinations of their patients. Public health agencies have pioneered in bringing to the general public a modification of the periodic examination through mass x-ray, blood testing, and multiple screening surveys.

A survey by G. R. Hess[1] of 1941 industrial establishments showed that "in the period 1929-1940, of 878 industrial concerns with 1000 or more employees, only 18.4% underwent routine periodic examinations; and during the period 1941-1945, of 241 industrial concerns with 1000 or more employees, only 16% underwent routine periodic examinations."[1]

The manpower shortage revealed by World War II taught us that routine and periodic physical examinations should be performed at least once yearly, "as the rejection rate of registrants examined before induction for ages 18 to 37 was 30.2%, and 51.6% for ages 38 to 44, with an average rejection rate of 32.7%."[2]

Shortly after the end of the war, more than 300 business corporations offered periodic health examinations to their executives. General Motors, in analyzing its experience in 1946, found that 590 of 718 executives examined showed some pathology, 24% of which was related to diseases of the heart and circulation. Consolidated Edison Company of New York, through Franco, reported its experience with examination of 300 executives showing that "periodic examinations uncovered major medical conditions in 25% of these executives, and these mainly involved the cardiovascular system."[3] Standard Oil Company had much the same experience, the Medical Director reporting that out of 290 executives examined, 200 had medical problems, many of which were important and materially affected their working ability.

A five-year survey of periodic health examinations conducted by Franco disclosed "that 33% of the 648 persons eligible for periodic examination showed abnormal conditions revealed to them for the first time — this was even more impressive when it was noted that more than half of these conditions were without symptoms of any kind, and the summary of the leading diseases indicated that the cardiovascular system was most frequently involved."[4]

Mallery and his associates in 1955 found that "on initial examination of 500 business executives, 52% were found to have one or more defects requiring treatment; in subsequent examinations of the same executives 12.7% to 20.3% were found to have developed new abnormalities requiring treatment."[5]

Fifteen Hundred for Study

THE NEW YORK Hotel Trades Council & Hotel Association of New York City Health Center, between October, 1950, and February 28, 1957, examined and/or treated over 30,000 hotel employees. The majority of these received initial complete physical examinations, which included (1) a thorough history to elicit all pertinent facts as to physical, social, and occupational status, (2) a complete physical examination and miniature chest x-ray, and laboratory studies such as blood hemoglobin, blood serology, urinalysis, and (3) electrocardiogram, stool examination, and other x-rays if indicated.

On March 1, 1953, the Health Center inaugurated its periodic examination program as an integral part of its over-all program of health education and preventive medicine. Through emphasis on the personal physician-patient relationship and the confidential handling of all medical findings, complete assurance of the patient is established toward the Medical Examiner and the Health Center, as well as the maintenance of patient cooperation. As will be noted in Table I, during the fiscal year ending February 28, 1954, 2816 (36.6%) periodic examinations were performed out of 7689 returning patients; and

TABLE I.

Fiscal year ending	2/28/54	2/28/55	2/29/56
Number Eligible	34,335	34,557	32,999
New Patients to Health Center	3,939	3,542	3,100
Previous years' Patients	7,689	8,145	8,568
Total Patients	11,628	11,687	11,668
Total Visits to Physicians	71,098	72,632	74,116
Number of Periodic Examinations	2,816	3,278	4,224
Percent of Periodic Examinations	36.6%	40.3%	49.3%

TABLE II.
DISTRIBUTION OF 1500 PATIENTS BY SEX AND AGE GROUPS

Sex: Male — 985 (65.5%)	Female — 515 (34.5%)	
Age Groups	Number of Patients	Percent
20-29	77	5.1
30-39	210	14.0
40-49	350	23.3
50-59	452	30.1
60-69	358	23.9
70-79	52	3.5
80-89	1	0.1

during the fiscal year ending February 28, 1955, 3278 (40.3%) of 8145 patients returning from previous years had periodic examinations.

An appraisal was made of the 4224 periodic examinations performed during the fiscal year ending February 29, 1956, and 1500 of these were chosen at random for study. All findings were recorded and placed on IBM cards.

As shown in Table II, 1160 (77%) were between the ages of 40 and 70. All of the 1500 patients had had an initial complete physical examination; 764 (50.9%) had one periodic examination; 599 (39.9%) had two periodic examinations; and 137 (9.1%) had three periodic examinations within a period of five years. The total number of periodic examinations performed on the 1500 was 2373, an average of 2.5 per patient.

In most cases the patients were seen first in the Emergency Clinic for some minor acute complaint, such as an upper respiratory infection, and appointments were made at that time for periodic examination at a later date in the General Medicine Clinic.

Of the examinations 1048 (69.8%) were requested by the Health Center physician; 443 (29.5%) by the patient; eight by the employer; one by a dentist.

No new diagnoses were indicated in 964 (64.4%) patients in the last periodic examination. The remaining 536 (35.6%) had one or more new diagnoses as indicated in Tables III-VIII.

With the institution of the periodic physical examination program several factors were taken into consideration: (1) examinations are performed with the cooperation, approval, and goodwill of the workers; a publicity campaign has been enlisted through labor publications and management periodicals to interest the employees in periodic examinations by emphasizing how great is the benefit to the workers themselves; (2) inasmuch as this program is a departure, periodic examinations are offered to the hotel employees as a voluntary measure — the older (in length of employment) personnel have an important influence in a hotel group, and it is most desirable that they believe wholeheartedly in the idea; (3) the confidential relationship between the patient and the doctor is maintained at all times, and all records of such periodic examinations are solely under the control of the Medical Department of the Health Center. This is a rule that is scrupulously regarded, and constantly emphasized to the workers; (4) the procedure of examination is so planned that an opportunity is given the employee for personal conference with the doctor so that the object of the examination may be carefully explained in each instance; equally, the findings of the examination are tactfully and patiently interpreted to the patient without unduly alarming him.

Personal conferences afford the physician time to discuss with the employee personal habits that influence health, such as sleep, rest, recreation, cleanliness, good nutrition, as well as any specific problem. The value of the periodic measurement of an individual's health is, quite naturally, enhanced materially if the examination itself is followed up by a revisit, rather than by a letter or telephone call, to communicate findings and advice.

This in itself is a major challenge — as evidenced by the frequency with which individuals leave a physician's office without understanding or remembering what they have been told or advised by the physician.

Objection to the periodic physical examinations

TABLE III.
NUMBER OF NEW DIAGNOSES ON 1500 PATIENTS ON LAST PERIODIC EXAMINATION

New Diagnoses	Number of Patients	Percent
One	443	29.6%
Two	74	4.9%
Three	16	1.1%
Four	3	0.02%

TABLE IV.
DISTRIBUTION OF MAJOR CONDITIONS DISCOVERED ON LAST PERIODIC EXAMINATIONS

Diseases	Total No. of New Diagnoses	Percent
Digestive	124	19.0%
Circulatory	116	17.8%
Metabolic and Nutritional	93	14.3%
Bones and Organs of Movement	61	9.4%
Genitourinary (Male)	51	7.8%
Neuropsychiatric	31	4.8%
Female Genital	27	4.1%
Allergic	22	3.5%
Diseases of Lungs	21	3.2%
Ear, Nose and Throat	19	2.9%
Malignancies	8	1.2%
Nervous	2	0.3%
Miscellaneous	76	11.6%

Of the 651 new diseases found 231 (35.4%) were asymptomatic and 420 (64.6%) were symptomatic, as indicated in Table V.

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TABLE V.

DISTRIBUTION OF TYPES OF DISEASES FOUND ON LAST PERIODIC EXAMINATIONS

	Asymptomatic	Symptomatic	Total
Malignant Neoplasms:	1	7	8
Skin	0	2	2
Lung	1	1	2
Esophagus	0	1	1
Stomach	0	1	1
Colon	0	1	1
Prostate	0	1	1
Allergic Diseases:	0	22	22
Angioneurotic Edema	0	1	1
Allergic Rhinitis	0	6	6
Hay Fever	0	10	10
Food Allergy	0	1	1
Drug Reaction	0	2	2
Urticaria	0	2	2
Metabolic and Nutritional Disorders:	13	80	93
Diabetes Mellitus	9	2	11
Gout	0	3	3
Hypothyroidism	0	2	2
Nontoxic Goitre	4	1	5
Obesity	0	72	72
Neuropsychiatric Disorders:	0	31	31
Anxiety State	0	24	24
Alcoholic Psychosis	0	3	3
Paranoid Reaction	0	1	1
Reactive Depression	0	1	1
Cardiac Neurosis	0	1	1
Conversion Hysteria	0	1	1
Diseases of Nervous System:	0	2	2
Neuralgia of Lower Extremity	0	1	1
Neuromuscular Disease	0	1	1
Diseases of Circulatory System:	85	31	116
Angina Pectoris	0	2	2
Cor Pulmonale	1	0	1
Arteriosclerotic Heart Disease	7	0	7
Arteriosclerotic Heart Disease, Including Coronary Disease	9	11	20
Hypertensive Heart Disease	5	1	6
Coronary Artery Disease	7	0	7
Essential Hypertension	20	2	22
Varicose Veins of Lower Extremities	36	9	45
Peripheral Vascular Disease	0	3	3
Phlebitis of Lower Extremities	0	3	3
Diseases of Lung:	7	14	21
Arrested Pulmonary Tuberculosis	5	0	5
Emphysema without Bronchitis	0	2	2
Sarcoidosis	0	1	1
Pericardio Goelemic Cyst	1	0	1
Asthma	1	5	6
Chronic Pulmonary Insufficiency	0	1	1
Chronic Bronchitis	0	5	5
Diseases of Digestive System:	38	86	124
Gastric Ulcer	0	3	3
Duodenal Ulcer	0	8	8
Cholelithiasis	0	2	2
Cirrhosis of Liver	1	2	3
Diverticulitis	0	1	1
Spastic Duodenal Bulb	0	2	2
Duodenitis	0	1	1
Diseases of Digestive System — Cont'd.			
Gastroenteritis	0	1	1
Functional Gastrointestinal Disturbance	0	15	15
Irritable Colon Syndrome	0	1	1
Spastic Colitis	0	1	1
Hernia (1 Hiatus, 30 Inguinal)	23	8	31
Hemorrhoids	14	31	45
Miscellaneous Rectal Disorders	0	10	10
Diseases of Genitourinary Tract:	29	22	51
Benign Prostatic Hypertrophy	19	5	24
Prostatitis	2	6	8
Pyelitis	0	1	1
Nephritis	1	1	2
Varicocele	3	0	3
Hydrocele	2	0	2
Miscellaneous Urethral Disorders	0	3	3
Miscellaneous Disorders of Bladder	0	5	5
Miscellaneous Disorders of Male Genital Tract	2	1	3
Diseases of Female Genital Tract:	8	19	27
Fibroids of Uterus	1	2	3
Ovarian Cyst	0	1	1
Cervical Polyp	1	2	3
Cervicitis and Cervical Erosion	2	6	8
Rectocele and Cystocele	2	2	4
Cysts (Labial and Vaginal)	1	1	2
Vaginitis	0	1	1
Miscellaneous Menstrual Disorders	1	4	5
Diseases of Ear, Nose, and Throat:	0	19	19
Deafness	0	10	10
Nasal Polyps	0	1	1
Sinusitis	0	3	3
Chronic Tonsillitis	0	1	1
Otitis Media	0	3	3
Mastoiditis	0	1	1
Diseases of Bones and Joints:	2	59	61
Arthritis	0	50	50
Bursitis and Tenosynovitis	0	7	7
Flexion Contracture Finger	0	1	1
Ganglion	2	0	2
Herniated Disc	0	1	1
Miscellaneous:	48	28	76
Anemias	27	3	30
Polycythemia	1	1	2
Hypercholesteremia	1	0	1
Renal Glycosuria	1	0	1
Latent Lues	3	0	3
Lymphogranuloma Venereum	0	1	1
Pregnancy	0	4	4
Cataracts	1	5	6
Miscellaneous Eye Diseases	0	7	7
Parasitic Infestation	1	1	2
Hyperventilation Syndrome	0	1	1
Pilonidal Sinus	1	0	1
Cystic Mastitis	2	0	2
Herpes Zoster	0	3	3
Superficial Benign Growths	10	2	12
Grand Total	231	420	651

is sometimes made on the basis that they cause unnecessary anxiety. If the individual is found to be in excellent health he has nothing to fear from the examination, and has added to his peace of mind and general feeling of well-being. If a pathological condition is found, corrective steps can be taken and the patient made to feel that by having the examination he has been saved pain, unnecessary loss of time from work, and perhaps expense. If an employee is one of a group in an industry, he will spread the word that a periodic examination is worth-while, as a result of his own personal experience. Expression of the employer's continuing interest in the good health of the employees often facilitates the acceptance of the periodic examination program, particularly when the employees understand that the examinations are not for the purpose of weeding out, and that job adjustments will be made when found necessary.

Many diseases begin slowly and may not produce any disabling symptoms until the condition has advanced considerably. Tuberculosis, cancer, kidney diseases, diabetes, arteriosclerosis, and certain forms of heart disease are examples of those that may go unnoticed in their early phases. A thorough physical examination made periodically, would detect disease early enough, in most cases, to permit proper and effective treatment. Accurate measurement of the full or real value

TABLE VI.
MOST PREVALENT DIAGNOSES OVER NINE FOUND ON LAST PERIODIC EXAMINATION

Obesity	72
Arthritis	50
Hemorrhoids	45
Varicose Veins	45
Hernias	31
Anemias	30
Anxiety State	24
Benign Prostatic Hypertrophy	24
Essential Hypertension	22
Arteriosclerotic Heart Disease with Coronary Disease	20
Functional Gastrointestinal Disturbance	15
Superficial Benign Growth	12
Diabetes Mellitus	11
Allergic Rhinitis	10
Deafness	10
Miscellaneous Rectal Diseases	10

TABLE VII.
NUMBER OF ROUTINE DIAGNOSTIC PROCEDURES BY WHICH NEW DIAGNOSES WERE DISCOVERED

Electrocardiograms	37
*Urinalysis	13
Chest X-Ray	8
Serology	3
Hemoglobin	32
Total	93

*Eleven of the 13 urinalyses led to the diagnosis of Diabetes Mellitus.

TABLE VIII.
NUMBER OF SPECIAL DIAGNOSTIC PROCEDURES PERFORMED TO CONFIRM DIAGNOSES

X-Rays:	
Bones and Joints	41
G.I. Series	19
G.B. Series	2
Barium Enemas	2
I.V.P.	2
Sinus	1
Total	67
Blood Chemistries and other Procedures:	
Pathological Study of Tissues	13
Proctoscopy	12
Fasting Blood Sugar	11
Cystoscopy	9
Audiograms	7
Allergy Tests	5
Basal Metabolism Test	3
Blood Uric Acid	3
Liver Function Tests	3
Stools for Ova and Parasites	2
AZ Test	1
Blood Cholesterol	1
Blood Urea Nitrogen	1
Frei Test	1
Sigmoidoscopy	1
Total	73

of periodic health examinations would require well controlled, extended studies of large groups. New and often significant diagnoses, as would be expected, continue to be made when health examinations are repeated on the same individuals at yearly or regular intervals, although with somewhat diminished frequency. More often, in the physical examination it is the x-ray or laboratory examination that leads to significant new findings. (See Table VII.)

Recently, fundoscopic examination, palpation of pulsations of lower extremities, palpation of thyroid to determine size, location, and any evidence of nodules, and palpation of the breasts to determine size, masses, or nipple discharge, were added to the Health Center initial physical examination and periodic examination forms as being essential to a thorough physical examination. Referral to the Proctology Clinic for examination has been made routine for any patient giving a history of passing blood by rectum. In the hotel industry, there are a fairly large number of employees who have resided in a tropical area within the past five years, and a routine examination of all stools for ova and parasites is made on all employees coming from areas where the incidence of such infestation is high; if parasites are found, these employees are referred to the Parasitology Clinic for treatment.

Early in 1953, routine EKG's were offered on a voluntary basis to all patients 45 years and over coming to the Health Center for examination or care. Similarly, other developments in mass diagnostic techniques are evaluated and utilized when practicable.

Comment

IN THE PAST five years, several articles have been written on periodic health examinations, but mostly on executives throughout industry; they have also been a subject of discussion at numerous medical meetings, although more particularly among doctors primarily interested in public health than those whose interests are confined to medicine as applied to industry.

Despite all the promotional efforts in its favor, the periodic examination in the hands of the private physician has never developed a significant activity. The prevailing system of fee for service in solo practice effectively discourages both doctor and individual from utilization of this form of preventive medicine. This is a major reason why industries, especially large corporations, have undertaken the periodic examination program, and, in the past six years, health centers supervised by labor and management have performed such examinations on employees. Every business man appreciates the fact that it is a good business principle to take inventory regularly to find the true state of stock, yet few persons carry over the stock-taking idea into the equally important field of personal health.

Summary

1. IN THE Health Center periodic examination program, of 4,224 examinations 1,500 were subjected to the extensive statistical analysis which led to this report.

2. Eleven hundred and sixty (77.3%) were between the ages of 40 and 70, with a ratio of two to one for the males.

3. Five hundred and thirty-six (35.6%) had one or more new diagnoses on their last periodic examination.

4. Digestive diseases (19.0%), followed by

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circulatory diseases (17.8%), were high among the most prevalent diseases found.

5. Of the new diseases found, 231 (35.4%) were asymptomatic.

6. *Arthritis was the most prevalent disease found.*

7. There were 93 routine diagnostic procedures by which the new diagnoses were discovered.

8. There were 140 special diagnostic procedures performed to confirm certain diagnoses.

Conclusions

EVIDENCE exists that the periodic measurement of the health of supposedly well individuals often leads to the discovery of significant, previously unrecognized, and frequently asymptomatic disease, and that, as would be expected, better results are frequently enjoyed when these diseases receive attention in their early stages. Thus, it is recommended that periodic examinations be performed on all employees annually.

The periodic should include a complete history, and a complete physical examination, with fundoscopic examination, pulsations of lower extremities, etc., as indicated in this paper.

The periodic examination should be done *not only on executives but also on all "rank and file" employees, including small industries where over 80% of wage earners are employed.*

Personal conferences of the physician with the employees who have medical defects should be a part of the periodic examination program in order that the findings may be carefully explained (so that the employee understands and accepts any condition that may constitute a hazard to his own health or the health and safety of others), and follow-up visits for care arranged when necessary.

If this program is carried out consistently, it will make for happier and more successful employees as well as healthier ones, because it is governed by environmental as well as medical factors. Moreover, the promotion of health in this manner increases an employee's value not only as a worker, but also as a total person who in turn will be a more useful citizen in all aspects of community life.

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References

1. HESS, G. R.: Medical Service in Industry and Workmen's Compensation Laws. Chicago, American College of Surgeons, 1946.

2. Public Health Reports: Physical Status of Registrants in World War II. Vol. 66, No. 19, p. 593 (May) 1951.

3. FRANCO, S. C.: Periodic Health Examination of Executives. *Indust. Med.*, 19:213 (May) 1950.

4. FRANCO, S. C.: The Periodic Health Examination. *Indust. Med. & Surg.*, 2:4, 161 (April) 1955.

5. BOLT, R. J., TUPPER, C. J., MALLERY, O. T.: Appraisal of Periodic Health Examinations. *A.M.A. Arch. Indust. Health*, 12:420 (October) 1955.

Industrial Dermatitis: A Major Health Hazard

MAN-HOURS lost as a result of exposure to skin irritants on the job cost industry some $100 million annually, according to estimates made by the Association of American Soap & Glycerine Producers. In a recent survey of 429,000 employees in 141 manufacturing plants, the Association found that 26% of the employees are exposed daily to potential skin irritants, and 9% of those exposed contract some form of skin trouble resulting in time lost from work. New employees are most vulnerable, it seems. Over a third of the companies participating in the survey report that skin ailments are most frequently contracted by employees within their first 30 days on the job. The health hazard is greater in small plants (500 employees or less) than in large ones, the findings indicate. Over 36% of the employees in small plants suffer exposure to skin irritation, as against the average of 26% for all plants, and sanitary facilities are likely to be less adequate in small plants than in larger ones. Educating employees to recognize the causes of dermatitis and to use preventive measures is the most effective way to combat the disease, advises the Association. Pointing up the need for further education is the fact that the incidence of dermatitis is high even in those plants where safeguards are provided. Almost all of the reporting companies furnish soaps and skin cleansers; more than two-thirds provide showers, protective clothing, or protective creams and ointments; and 82% allow employees paid clean-up time.

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The Legal Aspects of Employment of Impaired Workers

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THE physically impaired worker's prospect of earning a livelihood for himself and his family is, perhaps, his greatest difficulty; and in its proper solution, the members of the medical and the legal professions share a particularly grave responsibility. If, through misunderstanding and fear engendered by narrow and unrealistic applications of rules of law, he is denied the means of earning a livelihood, we shall have created a group of "industrial untouchables"; and the loser in this process is not only the workman and his family, but also the community.

The payment of awards to physically impaired workers for disabilities unconnected, or at most remotely connected, with industrial employment has the effect of closing the doors of industry in their faces. For many employers feel that their only defense against the unjust imposition of the costs of such awards is to refuse to employ the physically impaired workman. And thus, although the individual receiving the award may benefit immediately, the many handicapped workers seeking employment are denied the means of livelihood because of the employers' fears of increased costs of industrial insurance.

As members of the medical and legal professions, we — together with representatives of management, labor, and government — must find a common but realistic approach to this problem. Almost automatically this calls for the examination of the part each of us plays in the administration of state workmen's compensation acts in relation to the workman suffering from physical impairment.

No one would deny that the employment of impaired workers is a desirable objective. But well-intentioned "drives" having for their objective the employment of such workers will come to naught unless theory is made one with fact; and to bring that about requires the understanding and knowledge supplied not only by our own professions, but as well by vocational experts, shop committees, safety committees, government administrators, and, indeed, the courts themselves. You will agree that in this undertaking we are at the nexus of many fields of knowledge and endeavor; and a basically sound solution of the over-all problem of the employment of the physically impaired requires the utilization of the combined knowledge and experience gained in many different fields. To proceed otherwise is to oversimplify the matter.

We are realizing these days that knowledge within so-called specialized fields is not rigid and absolute; rather, it is but a component part of a greater whole. And thus it is with your profession and with mine. While we each pursue our specialized fields, neither of us can be oblivious to the endeavors of the other; for as the late Justice Benjamin N. Cardozo has pointed out, we are "groups united in a common quest, the quest for the rule of order, the rule of health and disease, to which, for individuals as for society, we give the name of law."[1]

In an address before the New York Academy of Medicine,[1] Justice Cardozo said:

"The idea is taking root that the subdivisions of science, like those of time itself, have been treated too often as absolute and genuine — that there is need to recognize them more fully as mere figments of the brain, mere labor-saving devices, helps to thinking, but, like other helps to thinking, misleading if their origin is neglected or forgotten. Thus it is that the physicist is learning from the chemist, the zoologist from the botanist, the economist from the statesman and the student of social science, the physician from the psychologist, and so on interchangeably and indefinitely. 'The sharp severance,' we are told, 'is giving way, and we perceive that all subjects, pass imperceptibly into others previously distinct.' Something of this same concept of the continuity of knowledge is making its way into the law. . . . More and more we lawyers are awaking to a perception of the truth that what divides and distracts us in the solution of a legal problem is not so much uncertainty about the law as uncertainty about the facts — the facts which generate the law. Let the facts be known as they are, and

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PRESENTED at a Meeting of the NORTHWEST ASSOCIATION OF OCCUPATIONAL MEDICINE, Portland, Oregon, September, 1956. The discussion was limited to the legal aspects of industrial injuries; due to time limitation no attempt was made to discuss occupational diseases as such, although many of the principles discussed are applicable to both.

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the law will sprout from the seed and turn its branches toward the light. We make out blunders from time to time, as rumor has it that you make your own. The worst of them would have been escaped if the facts had been disclosed to us before the ruling was declared."

If, then, we are to escape our past blunders, we must rely, in a large measure, upon you in the field of occupational medicine to disclose to us in the legal field the facts with respect to the effect of industrial employment upon the well-being of workmen suffering from physical impairment. These are the facts which generate the law; for at least in our modern society we no longer consider rules of law as abstract principles to be applied *in vacuo*.

Courts obviously are not experts within the field of medicine, let alone the field of occupational medicine. Moreover, realizing their limitations within this field, courts do not take judicial notice of medical matters on their own volition. They are lawfully able to consider *only* such medical factors as are disclosed to them by the testimony of medical witnesses. Since the causal relationship between disability and employment is primarily a medical matter, particularly where an impaired workman is concerned, courts rely upon disclosures of medical experts appearing as witnesses before them in determining that causal relationship in individual cases.[3] As the Supreme Court of Washington has pointed out:[4]

". . . courts must necessarily depend upon the evidence of experts . . . because of the fact that courts are not experts in medicine, lumbering, agriculture, mining, electricity, or any of the numerous activities of life, to the study of which men and women devote their entire time. It is also true that questions of whether a given physical defect is attributable to, or caused by, an impaired physical condition, must be determined from medical experts."

Conversely, if the facts which control the solution of individual cases are inaccurately disclosed by the expert witnesses upon whom the court relies in making its decision, that decision, based thereon as it is, will be unsound; for, as we know in theory — but often overlook in practice — a conclusion based upon an untrue premise is itself untrue.

Viewed realistically, the rules of law evolved by courts with reference to workmen suffering from physical impairment are in large measure but legal conclusions based upon the factual premises disclosed by medical witnesses. Thus the members of your profession, of necessity, are active participants in our common quest for wise and proper rules of law with reference to industrial employment of physically impaired workmen; your assistance is needed not only in the development of a wise set of rules, but as well in their proper application to specific factual situations.

IT IS AT this point that most of the confusion occurs in cases involving workmen suffering from physical disabilities. The confusion arises, in part at least, from misunderstandings between some members of the medical and legal professions. The use of dissimilar terminology by the two professions is obviously a contributing factor. But even more important, lawyers often misunderstand the complexity of the medical factors involved in the solution of individual cases, while physicians, on the other hand, often misunderstand the legal principles involved in the judicial process. All too often lawyers attempt to usurp the medical function, and physicians attempt to usurp the judicial function.[5]

This sincere but unwise attempt by physicians to perform the judicial function accounts more often than not, I believe, for the seeming disparity of opinion between physicians testifying on opposite sides in individual cases. Usually there is little, if any, disagreement concerning the *medical* diagnosis or the *physiological* dysfunction.

The disparity of opinion usually results from differing concepts of the *legal* principles involved. In other words, the seeming variation of opinion expressed by the medical witnesses does not usually result from their disagreement over *medical* matters, but rather from their disagreement over *legal* matters which, obviously, are outside the scope of the physician's field of expertness.[6]

This confusion and resulting uncertainty in the outcome of particular cases engenders, on the one hand, hope of compensation on the part of the workmen and their beneficiaries, and, on the other hand, fear of increased industrial costs on the part of the employers. The very uncertainty of outcome results in an unusually large number of litigated cases — tried too often upon an emotional basis rather than upon the basis of established legal principles and scientific facts.[7] As the result, this process has been characterized by Kessler as a "tournament" which results "in victory or defeat in a medical-legal tournament" rather than in a sound medical decision.[8] Professor Riesenfeld, Professor of Law, University of Minnesota Law School, has pointed out[9] that:

"This battle by teams of medical and legal experts is not only demoralizing, time consuming and expensive but produces, of course, unavoidable discrepancy and incongruity of awards, and, in consequence thereof, dissatisfaction."

The confusion, however, need not exist if sound principles of medical jurisprudence are applied to the solution of individual cases. Although a formidable term, medical jurisprudence is nothing more or less than the correlation of medical knowledge to the purposes of the law.

AS ONE step in attempting to clarify the medical-legal problem involved, it is the intent of this paper to discuss the purposes of the law as applied to impaired workmen as simply as accuracy will permit. If the purposes of the law can be clearly and accurately stated, the sound medical witness will, I believe, have no great difficulty in presenting scientific testimony which the courts can and will apply to the proper solution of the individual case.

The workmen's compensation laws were enacted in the States of Washington and Oregon in 1911[10] and 1913[11] respectively. They abolished the old common law concept that the workman could recover against his employer for industrial injuries only if the employer was and the workman was not at fault. Under the compensation acts the workman is able to recover awards for disabilities resulting from injuries sustained by him as the result of his industrial employment, regardless of fault either of the employer or the workman. It was the basic philosophy of these acts that industry should pay for the costs resulting from injury to its workmen. Thus the costs of disability awards are charged to the employers as a class generally, as well as specifically to the employer in whose employment the injury occurred. In theory at least, the employer whose accident record is bad pays a high premium for his industrial insurance, while the employer whose safety record is good benefits by a minimum rate.

On the other hand, the workmen's compensation acts were not designed to be insurance against all hazards of life and health. Their purpose was to charge industry for the costs of injuries and disabilities that were *industrially* caused. Accordingly, they do not provide for automatic payment of awards for all disabilities which occur or manifest themselves while the workman is working. To be compensable, the disability must be the consequence of a happening connected with the workman's employment. The Washington act, for example, defines a compensable industrial injury[12] as follows:

" . . . injury. . . . means a sudden and tangible happening, of a traumatic nature, producing an immediate or prompt result, and occurring from without, and such physical condition as results therefrom."

In explaining the meaning of this definition, the Supreme Court of Washington has said:[13]

"The statute is in no respect ambiguous or uncertain. It is plain, clear, concise, and is therefore not subject to construction, but the language used must be given its plain and ordinary meaning. Had it been the legislative intent to cover every kind of physical impairment occurring while a workman was in the course of his employment, it might very easily have employed language to express that intent, but it did not do so.

"The statute, segregated into its component parts, indicates very clearly that first, there must be a 'happening'; second, the happening must be of a 'traumatic nature'; and third, the happening must occur 'from without.'

"It seems apparent that the two phrases, 'of a traumatic nature' and 'occurring from without,' both modifying, as they do, the word 'happening,' can only mean that there must be an external act or occurrence which caused the injury and that such act or occurrence must be 'of a traumatic nature.' The source as well as the nature or character of the 'happening' are both determinative factors under the statutory definition."

The Supreme Court of Washington accordingly has consistently held that a workman is not entitled to a disability award for a disability caused by a progressive disease, even though the disability first occurred or manifested itself while the workman was working. Thus in a recent heart case the court pointed out that "mere acceleration of a disease by the routine of one's life is not compensable."[14] And in the same case the court said:

"Even in heart cases, compensability is not predicated upon principles of ordinary life insurance. Death, which is the last stage of a progressive disease, is not within the scope of the industrial insurance act. To be within the act, an *industrial injury* must have a causal relation to the death of the workman, who otherwise would have lived for an indefinite and unpredictable time. Mere acceleration of the final stage of a disease is not proof of the required causal relationship."

But it by no means follows that a workman will be denied a disability award merely because he is suffering from a pre-existing bodily infirmity or disease, if a happening on the job was a proximate contributing factor to the disability. In explaining the reason for this rule the Supreme Court of Washington has pointed out:[15]

" . . . . the provisions of the workmen's compensation act are not limited in their benefits to such persons only as approximate physical perfection, for few, if any, workmen are completely free from latent infirmities originating either in disease or in some congenital abnormality. . . . if the accident or injury complained of is the proximate cause of the disability for which compensation is sought, the previous physical condition of the workman is immaterial and recovery may be had for the full disability independent of any pre-existing or congenital weakness; the theory upon which that principle is founded is that the workman's prior physical condition is not deemed the cause of the injury, but merely a condition upon which the real cause operated."

Another way of saying the same thing, I think, is that the disability is compensable because, unless the happening had occurred, the disability would not have occurred. The proper point of inquiry in this class of cases is: was the dis-

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ability caused by an industrial happening, or was it caused by the pre-existing impaired condition alone. It is recognized, of course, that some cases will not permit of a precise answer. Where this is true, the medical witness should disclose as accurately as he can how and to what extent the industrial happening contributed to the claimed disability. For only if this is done can the court make a sound decision. Parenthetically, you may be interested in the comments of the Washington Supreme Court in reference to a case involving a situation such as we are now discussing.[16] The court said:

"The workmen's compensation act was adopted in this state, not to include and compensate cases 'erected out of imagination,' as the doctor termed it, or cases drawn from the field of 'speculation and surmise,' but only those cases where a causal connection between an industrial injury and a subsequent physical condition is established, with at least some degree of probability. As was stated in *Boyer v. Department of Labor & Industries*, 160 Wash. 557, 295 Pac. 737, there must be 'some evidence of probative value that removes the question of causal relation from the field of speculation and surmise.'

"An accident may be inferred from circumstances, but 'the evidence must present something more than a mere possibility or conjecture.' *St. Germain v. Potlatch Lbr. Co.*, 76 Wash. 102, 135 Pac. 804.

" 'The law will note and compensate for consequences of injuries reasonably certain to occur, and will base its judgments upon opinion evidence; but we know of no cases holding that the proximate cause of a disease can be traced by opinion evidence to an accident when the testimony, considering the lapse of time and the nonobservation of medical men, goes no further than to show that the injury might have been a sufficient cause.' *Anton v. Chicago, M. & St. P. R. Co.*, 92 Wash. 305, 159 Pac. 115."

FROM THE foregoing principles it is possible, I believe, to state the following rules:

1. A workman's claim for a disability award may not be disallowed merely because he had a pre-existing physical impairment.[17]

2. A claim cannot be allowed merely because a disability occurred or manifested itself while the workman was working.[18]

3. A disability due to "the relatively slow and insidious inroads of a progressive and . . . . incurable disease" is not allowable.[19]

4. To be compensable, there must be an affirmative showing that there was a "happening" both "sudden and tangible" occurring from without the body which caused the disability to occur when it did occur, and without which the disability would not have occurred when it did.[20] Stated conversely, without such a "happening" there can be no compensable injury.[21] The happening must be proved; it cannot be assumed.[22]

5. While the "happening" must be "sudden and tangible," it need not be dramatic.[23]

6. But the occurrence of a "happening" alone is not sufficient to allow a disability award. There must be an additional determination that the "happening" caused a "prompt or immediate result" which eventuated in physical disability.[24] Before allowance of a disability award, there must be an affirmative determination with *reasonable medical certainty*[25] that the "happening" caused the disability to occur when it did occur, and that except for such "happening," the disability would not have occurred when it did. Thus, in a leading case,[26] the Washington Supreme Court said:

"We have never held that the dependent of one who dies of heart trouble is entitled to compensation because the onset of an attack occurred while engaged in extrahazardous employment. We have never dispensed with a minimum showing that the employment or an incident occurring during employment must have been, more likely than not, a contributing factor to the death, without which the death would not have occurred when it did."

7. Whether, in a given case, the "happening" was more likely than not a contributing factor to the disability, without which it would not have occurred when it did, is a medical question which *must* be determined in each case upon the basis of *competent medical opinion*.[27] The courts recognize that the cause and effect relationship between the happening and the claimed disability is a medical problem, and they will not determine it as a matter of law. In a recent heart case[28] the Washington Supreme Court said: "The causal relationship between an injury and a subsequent disability or death must be established by medical testimony."

Thus, there is no declared common law that any particular type of case involving physical disability should or should not be allowed, particularly where the workman suffers from a pre-existing physical impairment. The courts wisely leave the practice of medicine to members of the medical profession. In each case, the courts determine whether there is or is not a causal relationship between a happening and disability solely from the testimony of the medical witnesses appearing in the record of the case.

VIEWED from the physician's standpoint, it is probably true that courts have reached inconsistent conclusions on similar or even identical factual patterns. But a careful case-by-case review, of Washington Supreme Court decisions at least, will reveal that any seeming inconsistencies have resulted not so much from inconsistent application of rules of law as from variant opinions expressed by the medical witnesses in various cases. To one who understands the judicial process, inconsistent results may be expected where ostensibly qualified medical experts express contrary opinions regarding identical factual situations.

And so my thesis is simply this: If the facts concerning the relationship between employment and disability are fully and accurately disclosed by the medical witnesses appearing in the judicial forum, the rules evolved by the courts will be wise and just, and their application to individual cases will be realistic and fair.

(3121 Arcade Bldg.)

References

1. Cardozo: Law and Literature, What Medicine Can Do for Law, p. 72.
2. *Ibid*, pp. 73-75.
3. Cf. *Kralevich v. Department of Labor and Industries* (1945), 23 Wn. (2d) 640, 656, 161 P. (2d) 66.
4. *Tonkovich v. Department of Labor and Industries* (1948), 31 Wn. (2d) 220, 226, 195 P. (2d) 638.
5. Cf. Jones: Commentaries on Evidence, (2d ed.) Vol. 3, p. 2417; Daily: Medical Aspects of Workman's Compensation, Proc. of the 1946 Convention of the International Association of Industrial Accident Boards and Commissions, U.S. Dept. of Labor, Division of Labor Standards, Bull. No. 87, p. 70 (1947).
6. In its First Biennial Report (1951) the Washington Board of Industrial Insurance Appeals emphasized (p. 6) that too often the trial technique employed in contested cases was to "pit one doctor's *legal* conclusion against another doctor's *legal* conclusion . . . ."
7. Also, Dawson, Problems of Workmen's Compensation Administration, U.S. Department of Labor, Bureau of Labor Statistics, Bull. No. 672, p. 127 (1940):

"The most serious and common defect in the conduct of compensation hearings in the states arises from . . . . prolonged medical controversies . . . . If some injured workmen are not already 'shell shocked' or neurotic before they attend a hearing and listen to the medical testimony, they are hardy and nonsuggestible if they leave the hearings in other than a hopeless state of mind."

In this connection, Ivan C. Rutledge, Professor of Law, Indiana University, has pointed out that "this experience is characterized by hostilities the community can ill afford to support." Rutledge: Administration of Heart Cases, 31 *Washington Law Review*, 67.
8. Kessler: Rehabilitation and Disability Rating, Proceedings 1946 Convention of the International Association of Industrial Accident Boards and Commissions, U.S. Department of Labor Standards, Bull. No. 87, pp. 54, 60, 61 (1947).
9. Riesenfeld: Basic Problems in the Administration of Workmen's Compensation, 8 *NACCA Law Journal*, 21, 37 (1951).
10. Laws of 1911, Ch. 74.
11. Oregon Laws, 1913, Ch. 112.
12. Laws of 1939, Ch. 41, Sec. 2.
13. *Flynn v. Department of Labor and Industries* (1936), 188 Wash. 346, 348, 62 P. (2d) 728.
14. *Mork v. Department of Labor and Industries* (1955), 148 Wash. Dec. 67, 69, 291 P. (2d) 650. More recently in *Haerling v. Department of Labor and Industries*, (1956) 149 Wash. Dec. 391, 301 P. (2d) 1078, the Washington Supreme Court said: "The cumulative effect of long continued routine and customary duties upon a workman, regardless of the hours devoted thereto, is not a sudden and tangible happening. The statute contemplates a happening, of a traumatic nature, producing an immediate and prompt result in order for the *injury* resulting therefrom to be compensable under the act."
15. *Miller v. Department of Labor and Industries* (1939), 200 Wash. 674, 682, 683, 94 P. (2d) 764.
16. *Seattle-Tacoma Shipbuilding Company v. Department of Labor and Industries* (1946), 26 Wn. (2d) 233, 242, 173 P. (2d) 786.
17. *Miller v. Department of Labor and Industries* (1939), 200 Wash. 674, 94 P. (2d) 764; *Guy F. Atkinson v. Webber* (1942), 15 Wn. (2d) 579, 131 P. (2d) 421. Cf. *Olympia Brewing Co. v. Department of Labor and Industries* (1949), 34 Wn. (2d) 498, 208 P. (2d) 1181, and cases therein cited; *Cyr v. Department of Labor and Industries* (1955), 47 Wn. (2d) 92, 286 P. (2d) 1038.
18. *Mork v. Department of Labor and Industries* (1955), 148 Wash. Dec. 67, 291 P. (2d) 650; *Cyr v. Department of Labor and Industries* (1955) 47 Wn. (2d) 92, 286 P. (2d) 1038; *Thora K. Peterson v. Department of Labor and Industries* (1952), 40 Wn. (2d) 635. 245 P. (2d) 1161; *Olympia Brewing Co. v. Department of Labor and Industries* (1949), 34 Wn. (2d) 498, 208 P. (2d) 1181.
19. *Higgins v. Department of Labor and Industries* (1947), 27 Wn. (2d) 816, 182 P. (2d) 559; *Mork v. Department of Labor and Industries* (1955), 148 Wash. Dec. 67, 291 P. (2d) 650. Cf. *Haerling v. Department of Labor and Industries* (1956), 149 Wash. Dec. 391, 301 P. (2d) 1078.
20. *Thora K. Petersen v. Department of Labor and Industries* (1952), 40 Wn. (2d) 635, 245 P. (2d) 1161; *Mork v. Department of Labor and Industries* (1955), 148 Wash. Dec. 67, 291 P. (2d) 650.
21. *Haerling v. Department of Labor and Industries* (1956), 149 Wash. Dec. 391, 301 P. (2d) 1078; *Higgins v. Department of Labor and Industries* (1947), 27 Wn. (2d) 816, 182 P. (2d) 559; *Flynn v. Department of Labor and Industries* (1936), 188 Wash. 346, 62 P. (2d) 728; Cf. *Thora K. Petersen v. Department of Labor and Industries* (1952), 40 Wn. (2d) 635, 245 P. (2d) 1161; *Cyr. v. Department of Labor and Industries* (1955), 47 Wn. (2d) 92, 286 P. (2d) 1038; *Mork v. Department of Labor and Industries* (1955), 148 Wash. Dec. 67, 291 P. (2d) 650.
22. *Cyr. v. Department of Labor and Industries* (1955), 47 Wn. (2d) 92, 2[illegible] P. (2d) 1038.
23. *Cf. McC[illegible] Lumber Co. v. Department of Labor and Industries* (1941), 7 Wn. (2d) 40, 108 P. (2d) 807; *Long-Bell Lumber Co. v. Parry* (1945), 22 Wn. (2d) 309, 156 P. (2d) 225.
24. *Thora K. Petersen v. Department of Labor and Industries* (1952), 40 Wn. (2d) 635, 245 P. (2d) 1161.
25. *Seattle-Tacoma Shipbuilding Co. v. Department of Labor and Industries* (1946), 26 Wn. (2d) 233, 173 P. (2d) 786.
26. *Thora K. Petersen v. Department of Labor and Industries* (1952), 40 Wn. (2d) 635, 640, 245 P. (2d) 1161.
27. *Cyr v. Department of Labor and Industries* (1955), 47 Wn. (2d) 92, 286 P. (2d) 1038; *Tonkovich v. Department of Labor and Industries* (1948), 31 Wn. (2d) 220, 195 P. (2d) 638; *Kralevich v. Department of Labor and Industries* (1945), 23 Wn. (2d) 640, 161 P. (2d) 661; *Seattle-Tacoma Shipbuilding Co. v. Department of Labor and Industries* (1946), 26 Wn. (2d) 233, 173 P. (2d) 786.
28. *Cyr v. Department of Labor and Industries* (1955), 47 Wn. (2d) 92, 286 P. (2d) 1038.

"Evangelistic" Statistics

THE DATA on which cancer of the lung are considered to result from cigarette smoking are not accurate enough to permit the conclusions which have been drawn. A man who smokes three packs of cigarettes a day may not inhale any more smoke than the man who smokes only one pack per day since the former may discard the cigarette when only one-third of it has been smoked. A man who smokes one cigar should not be converted into a statistical figure smoking 10 cigarettes. A pipe smoker should not be included in statistics as a cigarette smoker, and one pipeful of tobacco should not be considered to be equal to two and one-half cigarettes. Based upon such a study a man who smokes one cigar after each meal would be considered statistically to be a heavy cigarette smoker since he would fall into the pack and one-half group. Yet these conversions have been made in a number of the statistical studies.

—From "Cancer of the Lung and Smoking," by R. H. RIGDON, M.D., Professor of Pathology, University of Texas Medical Branch, Galveston.

Bus Workers in Their Later Lives

A Study of Employment of Drivers and Conductors from Age 60 Onwards

THE NUFFIELD FOUNDATION, 1957
London, England

FOR THE purpose of extending the scope of its published reports upon the employment of aging workers, the Nuffield Foundation sought the advice and cooperation of the London Transport Executive. The Director of the Foundation acknowledges in his foreword the generous help given to the inquiry; he mentions, however, that Mr. Le Gros Clark, who had undertaken the research, is alone responsible for what is said in the report. These industrial investigations are being made in response to the well recognized problems created by the "aging" of the country's labor force; the concern of research workers should be for the welfare of the older employees themselves; and their method of presentation should be thoroughly practical.

THERE are several reasons why the working conditions of older busmen are worth careful study. But one of the most important is the fact that when busmen are overtaken by symptoms of age or chronic sickness, they almost invariably have to leave their normal jobs altogether. They have not the advantage of their fellow workers in many other occupations who can often continue on their ordinary jobs if various adjustments and concessions are made for their benefit. It is thus possible with busmen to measure to some extent the true rate of aging as experienced by men who are employed under the conditions of modern industry.

For the main body of this report, the industrial records of 300 busmen from the age of 60 onwards were examined. The records were selected without bias, and appear to be a fairly representative sample. They were checked, however, against further records of 1151 busmen, whose careers had been partially traced through their later working lives. Some adjustments were then made in estimating what proportions of elderly men probably have to leave the buses at successive ages by reason of ill health, age, or death. About 90% of the men had joined the Service before the age of 40; and, though they had been subject to medical tests on recruitment, this would not be likely to have given them much physical advantage in later life over workers in other industries.

The study of busmen in London is supplemented by an Appendix prepared in collaboration with Dr. P. J. R. Challen, who had formerly been an industrial medical officer to the Manchester Corporation Transport Department. Dr. Challen had at that time examined a number of men on their retirement from the Manchester buses; and his findings are accordingly summarized in brief and related to the London statistics.

AT THE age of 60 all the 300 London busmen had apparently been fully effective. It seems probable that more than 80% of them subsequently left the buses through age or ill health (or in some cases, of course, through death). A study of their records shows that even before they reached the pensionable age of 65, rather more than 20% both of the drivers and of the conductors had been physically compelled to leave their normal jobs. Almost three out of four of these men seem to have been able for a time to undertake alternative work, usually of a comparatively light nature. Not many left the buses of their own accord before they reached their pensionable age, though several of them had clearly been subject to bouts of ill health. One reason may be that very few of them could have been offered any light work within the Service, once they had passed the age of 65. There is not sufficient light work available to accommodate all aging or ailing employees; and the men, therefore, preferred to stay on until they had a State pension on which to fall back if need arose.

Through their late 60's the decline in numbers among busmen due to age or ill health continued at a fairly constant rate. The records indicate that by the age of 67, only 31% of the original drivers were still on their accustomed work, and by the age of 69, only 15%. The remainder had been removed by death, age, or invalidity. Seven percent of them were still driving at the age of 70 and they then retired. Among the conductors there were 26% of the original men still on the job at the age of 67, and 16% at the age of 69. Eleven percent of them survived at work until the age of 70 and then also retired. It is thought that a few of them if willing might have remained to a yet later age. However, the traditional idea that 65 is the retiring age may have affected the retirement of a certain number of reasonably fit men about that age; the records are not always easy to interpret. The present figures have to be accepted as provisional estimates; and it is hoped subsequently to confirm or correct them by means of a more extensive survey.

A BRIEF examination of the records of a number of men in their late 50's showed that some losses were then already taking place by reason of ill health. The report analyzes the incidence of various complaints that had been associated with the departure of men from the buses. It then proceeds to examine in some detail the vital problem of providing alternative employment for such of the men as are compelled to leave their normal occupations, but are still capable of work of some kind. By the

time they were 65 about 10% of the original 300 men were probably in a chronic state of ill health and unable to work much longer; this appears to be a fairly common proportion among all industrial workers. A further 15 to 20% of men of the same age were, however, sufficiently fit to have remained on suitable alternative work, though they had to leave the buses. The difficulties that here arise are of an obvious nature. While the employing authority is able to provide light work for those of its long-service drivers and conductors who have to leave the buses before they attain the age of 65, most of the men thus transferred have to be discharged on reaching their pensionable age. The number of aging or ailing applicants for similar light jobs would otherwise become inconveniently large. Men still capable of working on the buses are retained in the service so long as they pass an annual medical examination. The same dilemma is today facing a number of modern industries. A varying proportion of their older employees are always being forced by age to seek alternative work; yet the structure of the industries is making it economically impossible to absorb all of them in lighter jobs. Mr. Le Gros Clark's report suggests that bus services are a fair representative example of problems of this kind, and it indicates the need for a careful inquiry to be made into the whole subject. The employment problem of many elderly men may otherwise become well-nigh insoluble.

[A copy of this report may be obtained on application from the Nuffield Foundation, Nuffield Lodge, Regent's Park, London, N.W.1, England.]

Books

Classic Reissued

ROSENAU'S PREVENTIVE MEDICINE AND PUBLIC HEALTH: KENNETH F. MAXCY, ED. Appleton-Century-Crofts, Inc., New York, 1956, pp. 1465, $15.00.

If Milton Rosenau were to see his book with its altered title and new raiment, he wouldn't recognize it, but he would approve heartily. Even the editor without immodesty observes that it has become a classic. Maxcy and 27 contributing authors of this 8th edition have so written that this book on preventive medicine long will maintain its status as a classic. Occupational health professes and performs allegiance to all of preventive medicine. So this text, in its entirety, is espoused. But first eagerness leads to exploration as to the extent of specialized coverage for environmental medicine including industrial hygiene and all of occupational health. The coverage as provided by Dr. Anna M. Baetjer is comprehensive and gratifying, but without effort toward total encompassment . . . for occupational health alone might require some 15 heavy volumes.

The industrial physician's world is a broad one, far broader even than the wide confines of occupational health. The reading of this book and the application of its contents will still broaden the scientific status of any physician. At this period some hundreds of industrial physicians, in order to become certified as specialists by becoming Diplomates of the American Board of Preventive Medicine, face the ordeal of an examination within all of preventive medicine. A working familiarity with the contents of this book provides almost a guarantee to the outstanding industrial physician for acceptance as a specialist. For that purpose this book is heartily sponsored, but that is not the sole reason for espousal. A full knowledge of it will qualify any physician for a higher level of performance of his obligations.

The Professional Employee

SUPERVISION OF SCIENTIFIC AND ENGINEERING PERSONNEL: JOHN T. LLOYD and ROBERT D. GRAY. Industrial Relations Section, California Institute of Technology, Pasadena, Bulletin No. 26, 1956, pp. 82.

One section of this estimable report of many ramifications is devoted to the characteristics of the professional employee. Captivated by this one section, these characteristics are here cited. "The professional employee has the ability to: Recognize the problem. Marshal facts and shift essential information from unessential information. Organize his efforts and think or carry the problem through to a logical and sound conclusion. The professional employee thrives on knowledge. He is curious. His curiosity leads him to seek more knowledge. He recognizes that the lack of knowledge is itself a problem. He has an urge to solve problems. He has the desire to transmit his findings and build on them. The professional employee needs approval of his intellectual accomplishments, a major source of prestige. The professional employee feels a need for independence and freedom of thought and action. He respects and appreciates good supervision, but he wants to maintain his state of professionalism and independence. He may accept from his supervisor an indication of the objective of the required research and the nature of the problem, but he prefers that the method of attack be left to him. The professional employee is 'self-energized.' Many of his rewards come from within himself. He is independent of others for motivation. He may be willing to perform menial and painstaking operations as a means of verifying or establishing something creative. He would not be satisfied to perform similar operations without the reward of creative achievement. (This may explain his reaction to 'paper work'). The professional employee has 'drive.' He has the capacity for work coupled with the constructive direction of personal effort. He has the desire to achieve results for the sake of the results as well as for personal gain. Management ability in the professional employee is dependent on skill in human relations. Management ability and business success appear to be related to the amount of participation in school and civic functions. Increased skill in human relations can be taught successfully to professional employees. Professional employees can be evaluated with respect to effectiveness in human relations. From these evaluations, estimates of training needs and of growth potentials can be made."

The industrial physician is a professional employee. He who reads this and learns, may run his department better.

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Industrial Medical Association

President's Page

MUCH has previously been said concerning IMA District Counselors, in Presidents' Pages and elsewhere. Still, there remains and will continue to remain, much more to say in respect to this all important motivated group with their resultant accomplishments.

The IMA History Committee has nearly finished its task and soon the completed book covering the history of Occupational Medicine will be available. In this book, on page 402, the formation of the District Counselor system will be covered. It will indicate that District Counselors are an outgrowth of a Committee on Component Societies, and it is maintained that the functions of the first District Counselors were to extend IMA from the central office to include the whole United States, and thus be representative of the entire country. This was one of the first steps in the decentralization of the functions of IMA, i.e., bringing IMA to the grass roots.

The original formation of Districts and appointment of District Counselors were in 1946 at which time there were established six Districts. This continued until 1950, when these six Districts were split to number 21.

Since 1950, the larger and/or most populated Districts have been divided further — there being at the present time 35 Districts, including Canada and the Territory of Hawaii. With Industry, Occupational Medicine, and IMA on the forward march, further partition is currently under consideration.

A Counselor is one who advises, represents, and/or manages. A Councilor is a member of a Council. Please forgive the semantics. It has been indicated, and I doubt if correctly so, that we use the term Councilor rather than Counselor.

DURING 1951 at the Industrial Health Conference in Atlantic City, the annual meetings of District Counselors were inaugurated. The seventh such meeting was held in St. Louis in 1957. With all IMA Officers and Directors, 23 Counselors attended and participated in this three-hour meeting. One attending this gathering most certainly was impressed by the motivation, efforts and accomplishments of this dedicated group.

During deliberations, problems common to all, as well as specific local problems, were freely discussed. It became increasingly clear that strictly speaking no two Districts are identical and that Counselors must be opportunists. All manner of subjects were discussed, including District activities, membership increases, and OHI participation. Fourteen of our District Counselors reported having made from one to five surveys for OHI accreditation. Seven Counselors from eastern Districts covering a total of 11 states, spoke concerning participation of Occupational Medicine in the Polio Immunization Program.

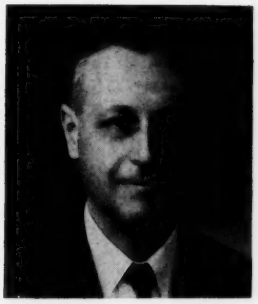
There was frequent reference to increasing liaison with organized medicine in both closely related and more remote fields. The result has been a development of genuine rapport and increasing understanding of Occupational Medicine. Likewise it became clearly evident that industry, management, labor, and Chambers of Commerce are coming more and more to recognize what Occupational Medicine has to offer. Let us pay homage to our District Counselors — to these ambassadors of better health — a devoted group. (Their pictures appear on the following pages. For the areas included in each district, see page 4.)

DETAILED minutes of this and the six previous meetings are available from the Managing Director's office. Attached to these minutes are written reports from the various District Counselors.

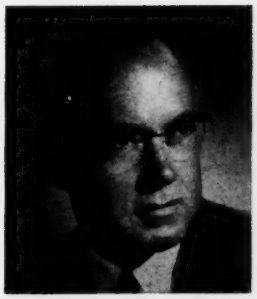
Jerome W. Shilling M.D.

IMA District Counselors

R. C. Thompson, M.D.
District 1



S. Charles Franco, M.D.
District 2



James H. McDonough, M.D.
District 3

John M. Kimmich, M.D.
District 4

Walter E. Fleischer, M.D.
District 5

Logan T. Robertson, M.D.
District 6

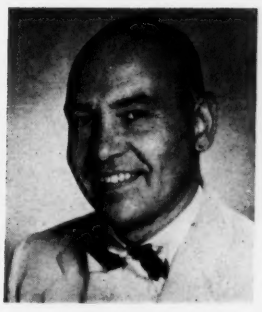
Joe M. Bosworth, M.D.
District 7

Joseph A. Llewellyn, M.D.
District 8

Paul A. Davis, M.D.
District 9

Charles E. Work, M.D.
District 10

Wilfred N. Sisk, M.D.
District 11



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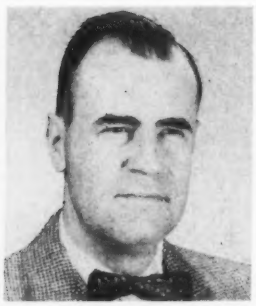

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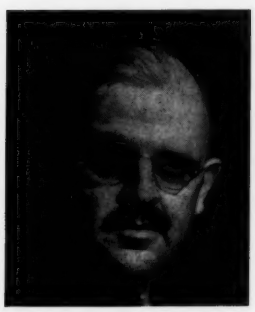

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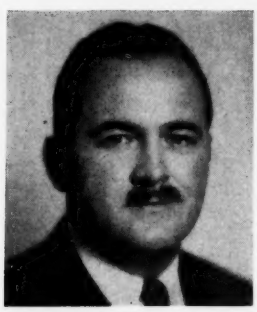

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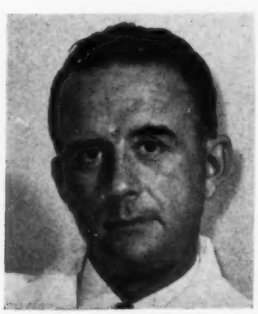

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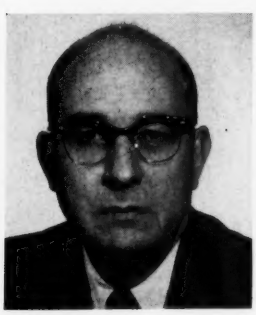

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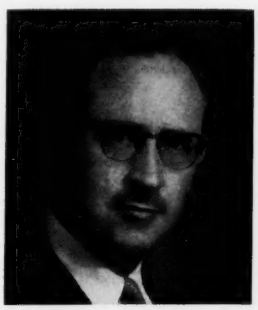

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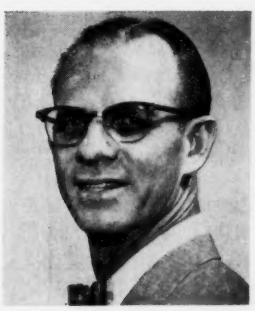

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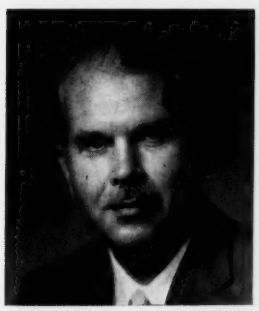

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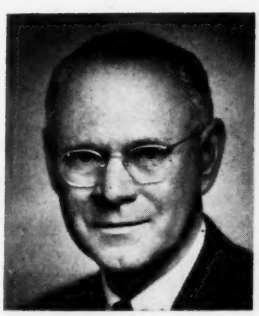

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Ludwig Teleky, M.D.—1872-1957

SELDOM has such singleness of purpose directed a man's life unrelentingly over as long a span of years as was evidenced in the life of Ludwig Teleky. Indefatigable investigation of occupational diseases, forceful efforts toward elimination of hazardous industrial conditions and prolific writing on his findings occupied Teleky from morning to night, from one decade to another, and even from one generation to another.

Based on observation of extensive clinical material, on personal inspection of numerous industrial operations, and on ready familiarity with the world's literature, Teleky held firm opinions on the occurrence, causation and prevention of industrial diseases. Severe in his attitude toward any industrialist who fell short of satisfactory measures of protection, Teleky was ruthless in the enforcement of regulations promulgated by his home countries of Austria and Germany, and critical of the more gently persuasive methods widely followed in this country.

Among his friends, Teleky revealed a warmth of feeling for his associates and evinced a subtle humor often not apparent under other circumstances. But even in an evening of conversation with a friend, he seldom deviated from his all-consuming subject of industrial hygiene.

Dr. Teleky arrived in the United States in 1939 after harrowing experiences in his native lands which he served so diligently. However, his heart never left the home lands. The years and the tribulations had exacted an enormous toll by the time of his coming to the United States. The truth is that he was never adjusted professionally or emotionally in this country even though a span of 18 years was spent in Chicago and New York prior to his death in Florida on August 30, 1957.

The February 4, 1955, issue of the *Artzliche Wochenschrift* presents an extensive historical and autobiographical account of Teleky's life. Much of the following is based on this account.

The beginning of his life interest dates from 1905 when Teleky was serving as the specialist for occupational diseases in the large Vienna sick benefit association, with all such cases excepting dermatoses being referred to him. An account of some 65 cases of lead paralysis which Teleky had personally observed was published in 1909. Dr. and Mrs. Teleky's excursion through the Bohemian forest hamlets in search of phosphorus necrosis cases among workers in the small white phosphorus match factories had its start with a case being brought to the Vienna surgical clinic. Eighty phosphorus necrosis cases were personally investigated by him with 142 additional cases reported. A similar investigation was made by Dr. and Mrs. Teleky in the mercury mining city of Idria during the summer of 1909.

Included in the autobiographical sketch are comments on the development of tuberculosis hospitals and other health centers in Austria in the early 1900's. Beginning in 1907 Teleky presented lectures at the University in Vienna on occupational diseases and industrial hygiene. Weekly plant visits and seminars were also conducted. With an early interest in tuberculosis prevention, he became secretary of the Austrian Association for the Control of Tuberculosis and, from 1917 on, edited the monthly *Tuberculosefursorgeblatt.*

By 1921 Teleky received and accepted an invitation to become the first Prussian official industrial physician for the Rhineland, and at the same time director of the West Germany Academy of Social Hygiene, established in Düsseldorf. After 13 years he returned to Austria impelled by the Hitler regime which later was the cause of his departure to the United States.

For two years he was associated with the Illinois Industrial Hygiene Division and later with the Industrial Hygiene Division of New York State, with residence in New York City throughout the remainder of his productive life.

Even in 1952 Dr. Teleky was active in his field as evidenced by his receiving an invitation from the Committee of the Second Austrian Session for Occupational Medicine to present a lecture at their Vienna meeting.

While in this country, Dr. Teleky's writings have included "History of Factory and Mine Hygiene" (in English), 1948; "The Development of Health Care" (in German), 1950; and "Occupational Poisonings" (in German), 1955. Teleky had been an editor of the German periodical *Archiv fur Gewerbepathologie und Gewerbehygiene* when its publication was first begun in 1930 and continued as an editor when this journal was resumed in 1954.

Dr. Teleky would not have wished any comments on his life to overlook the part played by Mrs. Teleky whose death preceded his by only a few years. She was constantly at work on the preparation of his writings and rarely does one see as devoted a pair.

Over the lifetime of Ludwig Teleky an era in occupational disease recognition and industrial hygiene progress has elapsed. Dr. Teleky has left his constructive stamp on this development.

—WARREN A. COOK

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Physicians of Distinction

THE ADVENT of specialty certification in occupational-health medicine with the existence of an officially recognized Board for the implementation of certification, manifestly is of outstanding significance to all of occupational health in North America. The administration of the Specialty Board's activities fully is beyond the control or influence of the Industrial Medical Association, the American Academy of Occupational Medicine, or any other such scientific body. That is as it should be. Notwithstanding, the coming of specialty certification for deserving industrial physicians has provoked a measure of wholesome competition between the Board Diplomate status on the one hand and, on the other, Fellowship status within IMA. At once it may be recognized that nearly all Board Diplomates already have attained to Fellowship in IMA.

Through recent action IMA is committed to a policy of lowering the requirements for admission to membership so that almost any physician demonstrably engaged in industrial health pursuits and who meets obvious basic requirements, such as licensure, becomes eligible. Otherwise the IMA determination is to exalt the requirements as to Fellowship to the end that outstanding attainments even above those long standing will be requisite to the achievement of Fellowship election. Frankly stated, the desire is to establish Fellowships within IMA on so high a plane of dignity, accomplishment, and standing that such Fellows will be recognized as being on a parity with Board Diplomates, and so marked by earned distinction.

This report of the Board of Examiners for Fellowship was accepted by the IMA Board of Directors on April 23:

I. That the three basic requirements for Fellowship, namely: (1) active membership in the IMA; (2) five years or more in the field of occupational medicine; and (3) achievement of distinction in this field, as stated in the By-Laws, be continued.

II. That the requirement of *"distinction"* be interpreted to include but not be limited to the following criteria:

1. Ethics and character.
2. Competency in the field of occupational medicine (OM).
3. Time devoted to the field of occupational medicine.
4. Attendance at medical meetings (IMA, component society, other).
5. Authorship required of recent article (within three years) in the field of OM published or accepted by an acceptable medical journal.
6. Leadership and participation in Committee work.
7. Postgraduate training (organized courses).
8. Teaching and/or participation in program on OM.
9. Research in the field of OM (clinical or laboratory).
10. Hospital affiliations.

III. That the Board of Examiners be authorized or instructed to develop appropriate measures in addition to present procedure which will aid them in properly assessing the qualifications of candidates for Fellowship in keeping with the By-Laws and in the light of the above criteria with respect to distinction.

Those physicians who are both Fellows in IMA and Diplomates of the American Board of Preventive Medicine, in Occupational Health, are

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twice blessed in their marks of distinction. Those others who possess either a Fellowship or Diplomate status distinctly are marked as industrial physicians of distinction, and so are to be recognized.

Heat Cataracts

IN THE British Islands cataracts among workers long have been associated with excessive heat exposure from infrared rays. In recent decades the annual number of compensation awards has been near to 12-15, chiefly from the glass and steel industries. Somewhat the same situation has obtained in Germany. In times not too far past the incidence among those truly exposed ranged from 6% to 20% as variously reported.

In the United States this trade affection almost wholly is unknown, except as rarely there has existed earlier exposure in Europe. The temptation is to deny even one authentic case, but that declaration may be unwarranted since United States occupational disease records distressingly are inadequate. It is known that some ordinary senile cataracts have been alleged to have been of work origin. Granting the verity of the statements here made, what difference in circumstances frees the United States from the minor plague of heat cataracts?

Before entering upon even a cautious answer, it may be contributory to note the major feature of heat cataract causation. Contrary to little remaining belief, ultraviolet rays play no part in true heat cataracts. The causative agent is the short length infrared ray with Angstrom lengths between 7,600 and 20,000. Such rays do enter the eyeball, reach the lens, and elevate the temperature of that bloodless organ. The quantity of heat falling upon the eye may be measured by suitable thermopiles. The results commonly are expressed in gram calories per square centimeter per minute. No known threshold of threatened injury exists. It is well established that no cataracts have appeared when some readings of 15 gram calories per square centimeter per minute have been made, and such lower readings as 2.4 gram calories per square centimeter per minute are regarded as distinctly below any threatening heat load. The requisite years of exposure are high. The average may be above 25 and the minimum may be 15. The hours of labor are most important as is the continuity of work. Intermittency of work appears to remove much of the menace, since the maintained elevated eye temperature may be crucial. In animal experiments such temperatures as 125°F are obtainable but always with damage. Closeness to the source of heat is significant, recognizing the rapid diminution of heat energy, inversely as the square of the distance. Finally it is observed that some 90% of heat rays may be averted by the use of mineral oxides in goggle lens, and that any type of eye covering permitting some vision, affords some measure of protection.

Having mentioned these several factors it may become almost unnecessary to emphasize some differences of exposure opportunity in the two countries. Always with exceptions, the hours of labor in the British Isles traditionally and factually have been longer. Much of the work leading to heat exposure in England has represented hand operations, while in the States mechanization has eliminated much hand work and thus the requirement of closeness to high temperatures. By and large the American workman is furnished better eye protection through suitable goggles and similar devices, but the same difficulty as to the worker's wearing protective instruments obtains here as in Great Britian.

All considered there is no real mystery as to the absence of heat cataracts among United States workmen and conversely a fair frequency in some other countries, albeit in England and in the glass industry in particular, heat cataracts are on the wane as to frequency.

This same comment might have been directed to occupational nystagmus, long a troublesome affair among British coal miners, while unheard of in the United States. Again there is no mystery. Working conditions seem to account for the respective "yes" and "no," but some imponderables remain.

Atrophy of Disuse

REST is not a universal panacea for fatigue, even among aging persons. In many cases, activity is a better remedy, especially when the fatigue results from "atrophy of disuse." In the absence of specific disease as a cause of fatigue, it arises in older persons from the normal physiological processes of aging which reduce the body's endurance; from loss of incentive, motivation and interest; from a decline of glandular activity, and from "atrophy of disuse." For a long time, the remedy for fatigue was to cut out something. If the patient did nothing more than sit in a rocking chair all day, he was usually advised to stop rocking. Now physicians know better; they now prescribe physical activity as a cure for fatigue.

—From "Control of Fatigue in Older Persons" by THEODORE G. KLUMPP, M.D., in *J.A.M.A.*, October 5, 1957.